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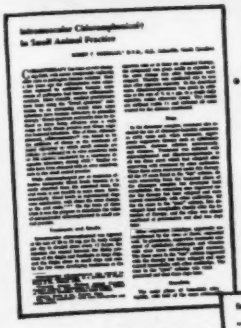

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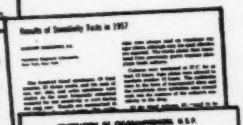

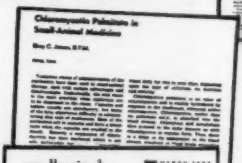

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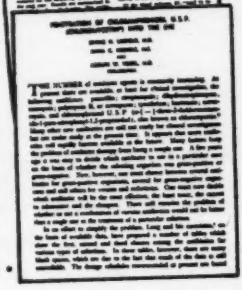

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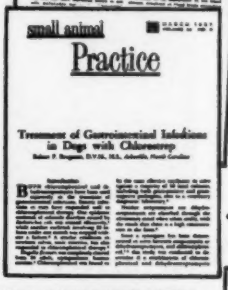

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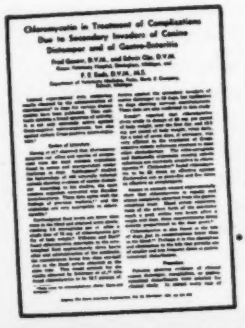

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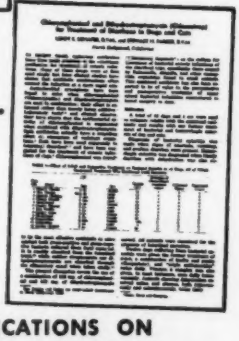

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1. Osborne, J. C. *in* New Horizons in Chemotherapy. Proceedings of First Regional Conference on the Nitrofurans in Veterinary Medicine. In press.
2. Bull, W. S.: N. Amer. Vet. 38: 3 (Jan.) 1957.

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1. Jones, S. V.; Belloff, G. B., and Roberts, H. D. B.: Vet. Med. 51:413 (Sept.) 1956.

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Vol. 54 September 1959 No. 10

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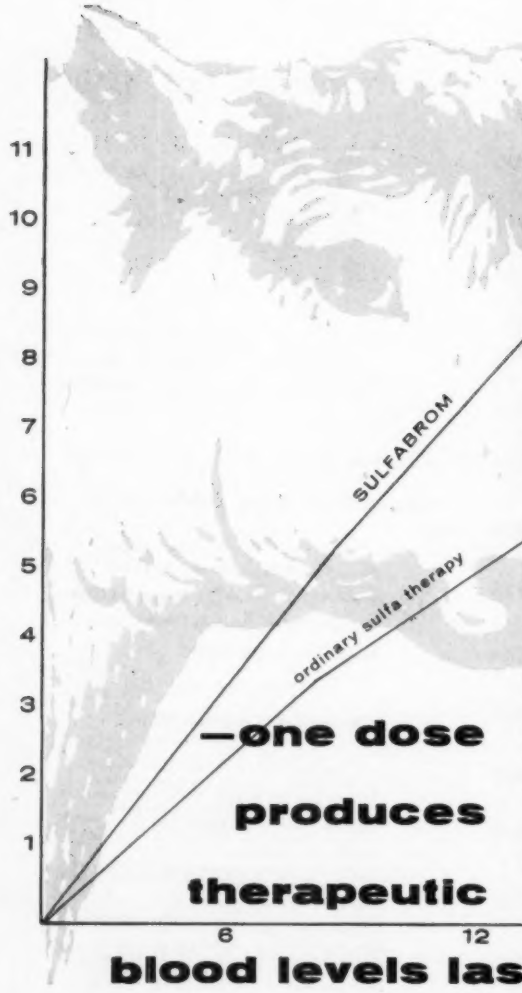

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More than any other professional man, the practicing veterinarian knows that his most valuable asset is time. In any area of his practice, the success of his therapy cannot be measured by results alone; he is a busy man whose time must be used judiciously.

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REFERENCES: 1. Mosier, J. E., and Coles, E. H.: Vet. Med. 53:649 (Dec.) 1958. 2. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 3. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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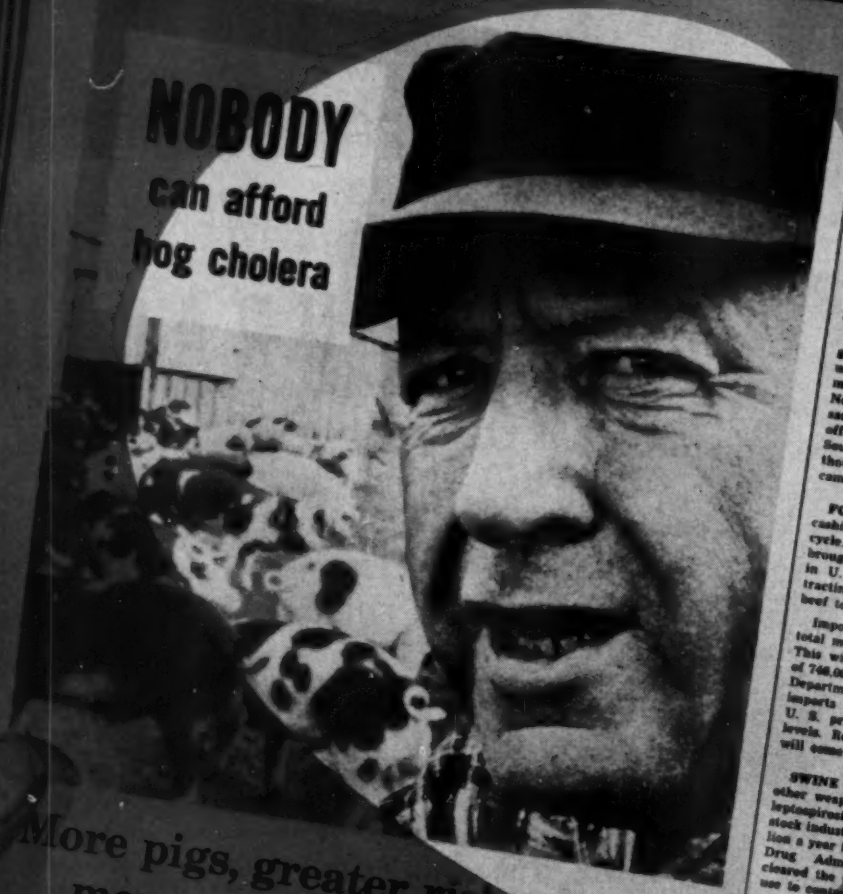

More pigs, greater risk— more reason for vaccination"

consult your veterinarian

he knows best —what's best

Cholera is a wholesale killer. When it strikes, your entire herd is at stake. Don't risk it. If you are farrowing more pigs this season—the gamble is just that much bigger. Have your pigs vaccinated and have your veterinarian pick the time and method. Nobody can afford hog cholera. Be on the safe side.

Through the last 8 years thousands of veterinarians have given millions of swine protection with Fort Dodge M L V. The first licensed modified live virus vaccine. Used simultaneously with serum, it gives immediate protection, establishes long-lasting immunity, in a single dose. M L V is patented. Made by the world's largest exclusive producer of veterinary products.

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The original modified live virus hog cholera vaccine

Keeping cholera in check is a job for both of us

No one knows better than the veterinarian how little it would take in laxness, carelessness and exposure for hog cholera to get out of hand. Thanks to modified live virus vaccines and broadly followed programs of vaccination, the record in recent years has been good. It is vitally important that it be kept good. The only real threat is the tendency of many hog raisers to "take a chance." And it is here that both the veterinary profession and the producers of vaccines share an important responsibility.

Fort Dodge Laboratories is releasing a series of educational messages in leading farm magazines. The messages urge vaccination—and they urge the use of veterinary services. They are designed to supplement and broaden your personal efforts in stressing the need for vaccination.

Eight years of successful use have established outstanding confidence in M·L·V, the original, first-licensed modified live virus vaccine. Produced exclusively for the veterinary profession.

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Daily Drovers Telegram • Daily Journal Stockman
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when used with proper dose
of anti-hog cholera serum,
induces immediate,
long-lasting immunity

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News Comment

Live Virus Ban Not Enough

"State laws and regulations prohibiting the field use of live hog cholera virus do not mean that the dangers of hog cholera have been eliminated and the disease eradicated in states having such laws and regulations," according to Keith E. Myers, chairman of the National Hog Cholera Committee of Livestock Conservation, Inc. and executive secretary of the National Swine Growers Council. He also noted, "While prohibiting the field use of live virus is an important step in the eradication of this costly disease, it is but one of a number of important steps that must be taken if this disease is to be eradicated." Myers cited control of movement of sick animals, garbage cooking, vaccination and disposition of animals dead from the disease as important factors.

Vacation Package

A vacation accident insurance policy to protect a man and his family for from three to 180 days anywhere in the world is now being issued by Continental Casualty Company. A package for a man, his wife, two children, costs $19.75. It offers: $25,000 for accidental death or dismemberment, $12,500 permanent total disability, and $2,500 medical expenses for the husband; for the wife and children, the plan offers $500 each for medical expenses.

Dehydrated Alfalfa

A grant for more research on the estrogenic content of dehydrated alfalfa has been authorized by the American Dehydrators Association. Estrogenic content of dehydrated forages is said to be one of the values of dehydrated alfalfa in feeding cattle.

FDA Problem

One of the by-products of the recent F.D.A. ruling on drug-food additives has disrupting implications. A firm already holding applications for inclusion of additives affected by the ruling cannot produce the feed at a second location or plant. Applications apply to plant location, not to firms.

New Milking Machine

A new milking machine has been designed by British researchers that makes possible reduction of "machine on cow time" by one-third. Suction ratio of the new unit is 4:1, which means that it draws milk four-fifths of the time attached. (American machines normally have a ratio of 2:1). The British unit registers 18 units of vacuum, whereas most American machines register only 11-14 units of vacuum. Researchers have obtained as high as 15 lb. of milk in slightly over three minutes with the new machine.

Microbial Insecticides

Application of "living insecticides" by conventional spray equipment may not be far away, according to research teams working with microbial insecticides. This view has been prompted by the development of a new fermentation method for producing living insecticides that can be used to fight crop pests and is harmless to man and animal alike.

Vodka and Glycerine

Grandmother's long accepted formulation of glycerine and rosewater takes on a new twist behind the iron curtain. An article appearing in the March issue of Rabotnitsa on facial skin care offers this suggestion: "It is desirable to rub the skin once or twice a day with fortifying substances, e.g., 2 g. hydrochloric acid, 10 g. glycerine, 70 g. mint water and 30 g. vodka."

Snake Host for WEE Virus

Scientists at the Public Health Service's Rocky Mountain Laboratory in Montana have uncovered evidence that the garter snake may be the winter host for the virus causing western equine encephalomyelitis. Studies demonstrated first that Culex tarsalis mosquito vectors feed on garter snakes in the absence of other hosts, and also that snakes fed on by mosquitoes became infected, developing a viremia of four to 20 days' duration.

Feed Plants in the Future

Feed plants every 100 miles in principal feeding areas may become a distinct possibility, according to one manufacturer, reporting in the August 1 issue of Feedstuff. "A feed manufacturer with a large plant and a traditional dealer system is reported considering setting up satellite mills, each of which would serve a few counties. Presumably premixes as well as concentrates would then go out from the main mill to these small mills, which would buy protein as well as grains locally. Another firm already has a setup like this and is planning gradual expansion of it."

NEW!

Hemostop*

lyophilized

prompt control of bleeding

The preoperative use of Hemostop facilitates any surgical procedure where bleeding is a problem. Hemostop—for prompt, safe control of bleeding in—

spaying
castrating
mastectomy
eye surgery
removal of anal glands
dental extractions
ear trimming
excising neoplasms
tonsillectomy
fractures, internal bleeding

—as well as other conditions where the integrity of the vascular bed is impaired.

In recommended dosage there are no contraindications.

For intramuscular injection. Each 5 cc. vial contains adrenochrome isonicotinic acid hydrazone, 25 mg., present as sodium 3 hydroxy 2 naphthoate complex. Diluent: water USP, 5 cc., benzyl alcohol, 2% W/V.

RECOMMENDED DOSAGE: Small animals, 0.25 cc. to 1 cc. Foals, 2 cc.; Horses, 5 cc.

Restricted to sale by or on the order of a licensed veterinarian.

THE S. E. MASSENGILL COMPANY

Veterinary Division

Bristol, Tennessee • New York • San Francisco • Kansas City

*U.S. Pat. 2,728,722

new product information report #203

TO: ALL VETERINARIANS

SUBJECT:

Elfaro-Dex

INDICATIONS: An iron dextran injectable for the prevention of anemia in newly-farrowed pigs.

ADMINISTRATION: Administer intramuscularly

DOSAGE: Single 2 cc. dose per baby pig, 1 to 4 days after farrowing.

PACKAGING: Elfaro-Dex is packaged in 10, 25, and 50 dose vials.

Elfaro-Dex is

Research Laboratories'

new iron dextran injectable produced to overcome the lack of iron in newborn pigs. For pigs farrowed during any season, an Elfaro-Dex injection on the first to the fourth day keeps sucklings fully protected against anemia for the all-important first 4 weeks. The baby pig utilizes feed better, becomes more thrifty, steps-up weight gains, and is ready for market sooner. Resistance to scours, T.G.E., and other infections is greatly increased.

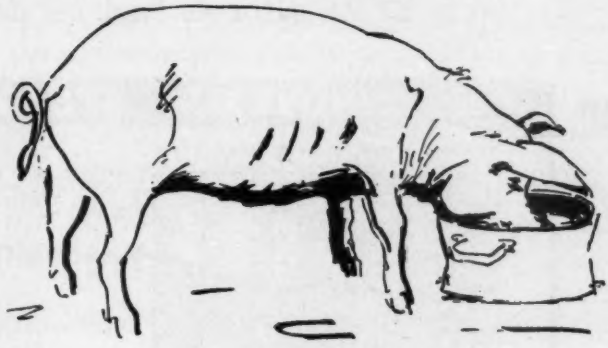
Elfaro-Dex is the time proved iron dextran injectable manufactured by Benger Laboratories, Ltd., Holmes Chapel, Cheshire, England.

Write for further information and free client literature.

Research Laboratories, Inc. St. Joseph, Missouri

Research Laboratories sells its products only to graduate veterinarians.

New, convenient, efficient way to treat porcine necrotic enteritis due to Salmonella choleraesuis



CLINICAL RESULTS: Field tests[1,2,3,4] indicate perorally administered FURACIN to be safe and specific for uncomplicated Salmonella infections and necrotic enteritis of swine and beneficial in other nonspecific enteric conditions of swine. Controlled laboratory studies[5,6] demonstrate that FURACIN Water Mix in drinking water for 7 consecutive days prevents mortality and aids in maintaining normal growth of pigs infected 2 days prior to treatment.

METHOD: Add FURACIN Water Mix to the drinking water in proportions of 330 Gm. (1 carton) to each 36 gallons. Continue medicated water for at least 7 days.

FURACIN®

BRAND OF NITROFURAZONE

WATER MIX

SUPPLIED: Carton of 330 Gm. Available from your professional veterinary distributor.

REFERENCES: 1. Vickers, C. L.: Personal communication. 2. Filion, R., and Trepanier, M.: Personal communication. 3. Lannek, N., and Brag, S.: Vet. Med. 49:75-78 (Feb.) 1954. 4. Felgate, C. A., and Swann, H. C.: Vet. Rec. 68:259-262 (May 5) 1956. 5. Guthrie, J. E.: Vet Med. 47:307-314 (Aug.) 1952. 6. Guthrie, J. E.: Personal communication.

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... tests prove Synovex weight gaining implants
stimulate up to **.81** lbs. extra per steer per day,
up to **.49** lbs. extra per heifer per day,
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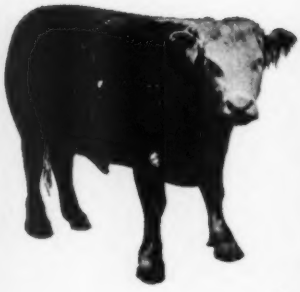
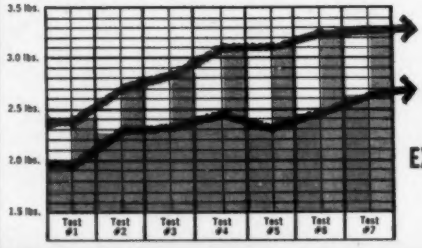


SYNOVEX-S STEERS

Average daily gain per head, tests 1 thru 7.



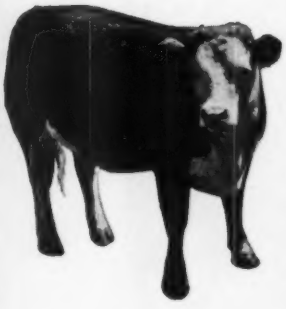
Average for 7 tests:

with SYNOVEX-S **2.95***

without SYNOVEX-S **2.34***

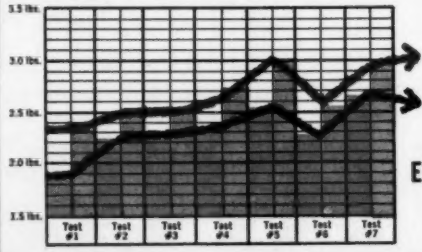
EXTRA with SYNOVEX-S **.61***

* lbs. head/day



SYNOVEX-H HEIFERS

Average daily gain per head, tests 1 thru 7.



Average for 7 tests:

with SYNOVEX-H **2.64***

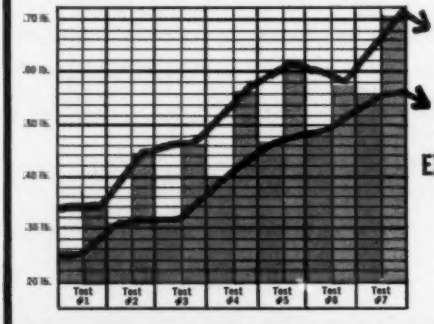
without SYNOVEX-H **2.31***

EXTRA with SYNOVEX-H **.33***

* lbs. head/day

SYNOVEX-L LAMBS

Average daily gain per head, tests 1 thru 7.



Average for 7 tests:

with SYNOVEX-L **.53***

without SYNOVEX-L **.40***

EXTRA with SYNOVEX-L **.13***

* lb. head/day

STEERS, HEIFERS OR LAMBS
to market weight?

YOU CAN USE AND RECOMMEND THESE SYNOVEX BALANCED HORMONE IMPLANTS WITH CONFIDENCE

Synovex-S, H and L contain only *natural* hormones for optimum improvement in rate of gain and feed conversion ratio with no undesirable alteration of carcass conformation.

SYNOVEX-S FOR STEERS	Steers implanted with Synovex-S make higher weight gains at lower cost per lb. of gain, reach market weight faster with better bloom, fine finish and quality meat. Feedlot men save up to 5c per lb. as feed conversion improves up to 20%. Synovex-S contains only natural hormones and does not produce undesirable carcass changes as may occur with synthetic hormone-like chemical compounds.	SYNOVEX-S contains 200 mg. of progesterone and 20 mg. of estradiol benzoate. Contents of entire 1-dose cartridge (8 tiny pellets) are implanted simultaneously. Recommended for steers weighing from 400 to 1000 lbs. One implant lasts entire finishing period.
SYNOVEX-H FOR HEIFERS	Synovex-H stimulates dramatic improvement in rate of gain and feed conversion without undesirable changes in shape or appearance of the carcass. Your clients get faster weight gains; up to 20% more meat from the same quantity of feed, better bloom, fine finish, excellent texture and quality of meat. Synovex-H contains only natural hormones, chemically identical to those produced by the animal's endocrine glands.	SYNOVEX-H contains 200 mg. of testosterone propionate and 20 mg. of estradiol benzoate. Contents of entire 1-dose cartridge (8 tiny pellets) are implanted simultaneously. Recommended for heifers weighing 400 lbs. or more. One implant lasts entire finishing period.
SYNOVEX-L FOR LAMBS	Developed exclusively for lambs, Synovex-L helps your clients get feeder lambs to market up to 30 days faster. Feed conversion improves up to 20%. Synovex-L contains only natural hormones. Sheepmen get the maximum profit out of the short lamb feeding period safely—without risk of downgrading.	SYNOVEX-L contains 25 mg. of progesterone and 2.5 mg. of estradiol benzoate. Contents of entire 1-dose cartridge (2 pellets) are implanted simultaneously. One implant lasts entire finishing period, from 60 to 150 days.

SYNOVEX IMPLANTER MAKES IMPLANTING AS EASY AS VACCINATION

The Synovex implanting instrument for steers, heifers and lambs is easy to use, speedy and efficient. No pre-slitting of skin with knife. Merely insert needle point between skin and cartilage of ear and depress plunger. A strong, all-metal, precision-made instrument designed for years of reliable service. (Each single dose of Synovex-S, H and L comes ready for use in a plastic cartridge which fits into hollow shank of implanter.)

SYNOVEX-S, H and L are available in 10-IMPLANT and 100-IMPLANT packages. For best results, feeder stock should be free from parasitism and feedlot diseases and fed a balanced high energy ration.

For additional information about **Synovex-S** **Synovex-H** **Synovex-L** write: SQUIBB, *Veterinary Department* 745 Fifth Avenue, New York 22, N. Y.

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SQUIBB

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SYNOVEX H

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vitamin-mineral dietary supplement—with taste appeal to small animals

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This new meat-flavored dietary supplement contains nineteen important ingredients in tablet form. Small animals like them!

The comprehensive Pet-Tabs formula:

- Balances the daily ration.
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Dosage: 1 Pet-Tab daily.
Supplied: In bottles of 50. To veterinarians only.

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*"tamed iodine"**

now in **3** convenient forms

Weladol®†

(Polyalkyleneglycol Iodine Complex)

CREME, SHAMPOO AND NEW DISINFECTANT

gives you iodine's potent fungicidal and bactericidal action

. . . *without* iodine's characteristic toxicity, irritation or stain

Weladol . . . 6 years in the laboratories . . . 3 years in clinical evaluation . . . has been used successfully and safely in a wide range of hard-to-manage skin conditions of dogs, cats, horses and other species of large and small animals.

†U. S. Patent No. 2,759,869 *Trademark

Weladol Shampoo in 4 fluid ounce plastic bottles and 1 quart glass bottles
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PITMAN-MOORE COMPANY DIVISION OF
ALLIED LABORATORIES, INC.
Indianapolis 6, Indiana

TRENDS IN LARGE ANIMAL PRACTICE

Melting snow, urine and manure create a problem in a low area of the corrals.

JOHN B. HERRICK, D.V.M.

Extension Veterinarian
Iowa State College
Ames, Iowa

Pictures courtesy of Hoard's Dairyman

Well-drained area of corrals. Barn in background is 896 feet long. The herd shown here belongs to 65 farmers.

VETERINARIANS in a large animal practice are confronted with the changing agricultural scene and are hearing words such as contract farming, vertical integration, group practice, and a few other phrases that depict the changes in large animal production. It is true that these production changes are occurring with units of several thousand animals, thus creating the impression that smaller units are doomed. Many practitioners are looking into the future to see how this will affect their practice. New graduates into the veterinary profession are wondering whether there will be a place for them where they can maintain a good general practice.

A typical signal of changes in agriculture came with the advent of a contract milking enterprise called Fashion Farms at Meservey, Iowa. Mr. Carroll Morris, a young, energetic man of 23 years developed a "contract milking enterprise" in central Iowa approximately one year ago. On ten acres of land he developed a $200,000 unit capable of handling 1,000 to 1,200 cattle. Mr. Morris observed that farmers milking small herds for a manufacturing market could get a higher price for their milk if they could acquire a grade A market. Many of these farmers were not equipped to handle grade A milk, nor could they finance the equipment to qualify for grade A.

Courtesy Hoard's Dairyman

Carroll Morris, owner of Fashion Farm. Although the first winter's experience was difficult, results have encouraged him to plan added operations.

It has also been observed that many farmers who milk cows maintain only a small number and do not use production testing technics, sound herd health practices, or in general operate as dairymen should. This type of herd has been on the way out for some time, and when a cow pool opened up they were the first to consign their cows.

Morris, in setting up his enterprise, moved with great rapidity in developing the physical plant and arranging for the entry of the cattle. The contract calls for a $30 per cow per year entry fee. The cattle are housed, fed, milked, bred and managed entirely by the pool. The cows are DHIA tested and fed according to production. All expenses are deducted and Morris receives 5% of the net for managing the pool. The remainder is forwarded to the farmer each month.

Fashion Farm

HEALTH INSPECTION

The Following Inspection Chart Must Be Filled Out By A Veterinarian and Should Accompany The Official Health Certificate.

Owner's Name ..... Address .....

Phone ..... Breed Of Cattle ..... Size Of Herd .....

Production Testing Records .....Assembled Herd .....

Herd Raised On Farm .....

Number Of Cows Entering Pool .....

Physical Examination

Ear Tag	Age	General Condition	Condition of Udder* RF	LF	LR	RR	Condition of Feet	Remarks	Weeks Vacc.

* Animals infected with mastitis will not be allowed entry to the pool. Udders Classified As:

1. Normal quarts and normal milk.
2. Slight induration but milk appears normal.
3. Distinct fibrosis, abnormal milk, palpect test orifice or marked atrophy.
4. Marked or bibular fibosis, marked atrophy, abnormal milk, leaking test.

HEALTH EXAMINATION

a. Is The Herd T.B. Accredited? Date of Last Test (Conducted Within 30 Days Prior To Entry To Pool). .....

b. Brucellosis: All Animals Entering Pool Must Originate From Brucellosis Free Herd. Date of Such Test .....

c. Leptospirosis: All Animals Must Be Negative To Leptospirosis Test and Then Vaccinated At Least Two Weeks Prior To Entry To The Pool. Date of Test..... Where Conducted..... Date Of Vaccination.....

d. General Health Restrictions:

Animals With External Parasitism, Metritis, Pink Eye, Respiratory Disorders Or Other Infectious or Contagious Diseases Will Not Be Eligible For Entry Into The Pool.

The Pool Reserves The Right To Quarantine and Re-examine The Cows and If Not Found Satisfactory By Pool Veterinarian, Will Be Returned To Owner In 7 Days From Time Of Entry To Pool.

I Hereby State I Have Examined Above Cows and Conducted Above Tests.

Name Of Veterinarian ..... Address .....

Date .....

A grade A market is maintained with the milk going to Kansas City by truck.

Morris originally set up his enterprise without a great deal of emphasis on health. Originally he did not have a veterinarian to aid him in setting up health standards or

effect daily inspections. The mere fact that a large share of the cattle consigned were from small herds contributed to the fact that many of them entered were infected with mastitis. Most of them were cattle from unprofitable herds. Consequently, when records were kept on the cattle, many of the owners found their checks were small. Coupled with this, Iowa experienced a rough winter in 1958 and 1959, and the cow pool found that manure removal and general feed handling was a problem for over 1,000 cows.

The Health Problem

Early in the spring of 1959 Morris consulted with the writer for aid in solving many of his problems. Morris stated that the bacterial count on his milk was up and that he was being plagued with rumors on the way the pool was handled. In general the outlook was not bright. The first recommendation given Morris was to obtain veterinary service. Drs. Misner and Classick of Belmond duly agreed to handle the health problems in the herd. Then Herrick outlined a system of culling in the herd and rewrote the contract for cattle entering the pool so that the animals were screened out on the farm by the local veterinarian.

Within six weeks over 200 cows were culled from the pool. Drs. Classick and Misner found that most of the animals in trouble were infected with mastitis. Old cows, poor footed cows and those low in production were eliminated. Herrick outlined and demonstrated to the milkers proper milking procedures. Within a short time the bacterial count dropped from 150,000 to below 7,000. Milk production went up and Morris built a large hospital for quarantining new cattle and housing those that were ill. At the present time, the operation is sound and profitable.

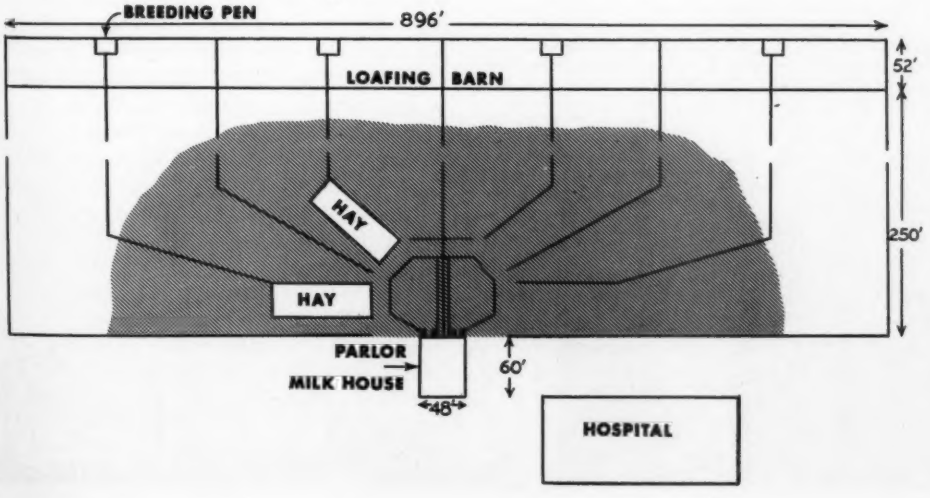
Screening the Cattle

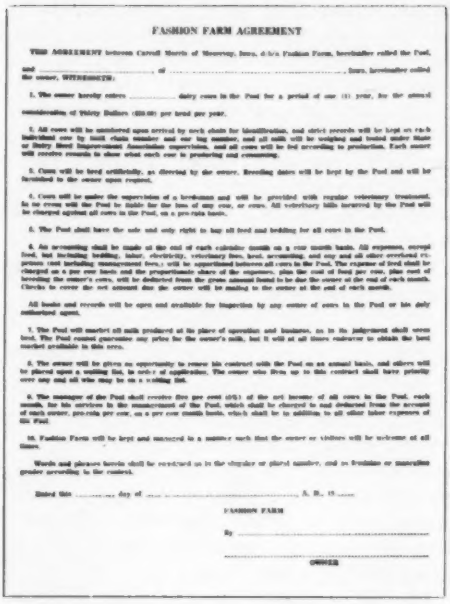
The system of having cattle screened closely on the farm by the local veterinarian has paid dividends. A health chart is forwarded to the prospective consignor who has the animals checked by his local veterinarian. If the cattle pass they are then rechecked by the pool veterinarian before being added to the herd.

Drs. Misner and Classick visit the pool daily, going over the herd, observing milking procedures, and taking care of the cattle needing treatment.

As yet, these two veterinarians are handling the fees on a per call basis. Eventually, it is believed that a retainer for health supervision can be instituted.

Death loss in the pool has been less than 1%. The pool has experienced a minimum





FASHION FARM AGREEMENT

THIS AGREEMENT between Carroll Morris of Shoreway, Iowa, d/b/a Fashion Farm, hereinafter called the Pool, and ..... of ....., Iowa, hereinafter called the owner, WITNESSETH:

1. The owner hereby enters ..... dairy cows in the Pool for a period of one (1) year, for the annual consideration of Thirty Dollars ($30.00) per head per year.

2. All cows will be numbered upon arrival by neck chain for identification, and strict records will be kept on each individual cow by said chain number and ear tag number, and all milk will be weighed and tested under State or Dairy Herd Improvement Association supervision, and all cows will be fed according to production. Each owner will receive records to show what each cow is producing and consuming.

3. Cows will be bred artificially, as directed by the owner. Breeding dates will be kept by the Pool and will be furnished to the owner upon request.

4. Cows will be under the supervision of a herdsman and will be provided with regular veterinary treatment. In no event will the Pool be liable for the loss of any cow, or cows. All veterinary bills incurred by the Pool will be charged against all cows in the Pool, on a pro-rata basis.

5. The Pool shall have the sole and only right to buy all feed and bedding for all cows in the Pool.

6. An accounting shall be made at the end of each calendar month on a cow month basis. All expenses, except feed, but including bedding, labor, electricity, veterinary fees, feed, accounting, and any and all other overhead expenses (not including management fees,) will be apportioned between all cows in the Pool. The expense of feed shall be charged on a per cow basis and the proportionate share of the expenses, plus the cost of feed per cow, plus cost of breeding the owner's cows, will be deducted from the gross amount found to be due the owner at the end of each month. Checks to cover the net amount due the owner will be mailed to the owner at the end of each month.

All books and records will be open and available for inspection by any owner of cows in the Pool or his duly authorized agent.

7. The Pool will market all milk produced at the place of operation and location, as in its judgement shall seem best. The Pool cannot guarantee any price for the owner's milk, but it will at all times endeavor to obtain the best market available in this area.

8. The owner will be given an opportunity to renew his contract with the Pool on an annual basis, and others will be placed upon a waiting list, in order of application. The owner who lives up to this contract shall have priority over any and all who may be on a waiting list.

9. The manager of the Pool shall receive five per cent (5%) of the net income of all cows in the Pool, each month, for his services in the management of the Pool, which shall be charged to and deducted from the account of each owner, pro-rata per cow, on a per cow month basis, which shall be in addition to all other labor expenses of the Pool.

10. Fashion Farm will be kept and managed in a manner such that the owner or visitors will be welcome at all times.

Words and phrases herein shall be construed as in the singular or plural number, and as feminine or masculine gender according to the context.

Dated this ..... day of ....., A. D., 19.....

FASHION FARM

By .....

.....
OWNER

Pictured here is a hospital barn which is used for holding, treating and milking cows that require veterinary care. The structure is worth $45,000.

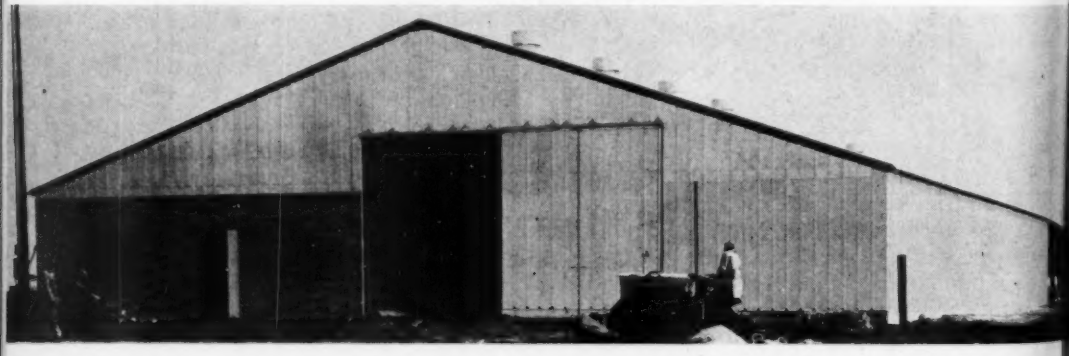
of trouble from disease. The major problem has been mastitis and it is now under control. Control of mastitis has been achieved in the main by strict admittance requirements.

The Pool's Future

When Fashion Farms first started, there were rumors of several other contract milking enterprises to be started in Iowa. To date only one is in full operation although two or three more are being organized. There are others now operating in other states, and in the near future there will be more.

To the veterinarian a contract milking enterprise means that many small herds are concentrated in one large herd. Many of these small herds would have gone out of business eventually if a cow pool had not been made available. Already it has been found that the cattle from small, unprofitable herds are not desirable candidates for a contract milking setup. Most cattle now consigned have been purchased by investors for the pool. They are largely first calf heifers, costing over $300, and many of them are returning over 20% on the investment. Thus investors are intensely interested now in contract milking.

Fashion Farms may not be a typical example of integration or contract faming, yet it is a good example of the need for sound disease prevention programs and the need for veterinary service. Veterinarians are in a position to guide such enterprises both in the dairy and other fields in disease prevention programs. There is involved in disease



prevention mechanics other than the curative phase. Veterinarians should be aware of the social stigma many livestock producers attach to "bigness" in animal production. Integration and contract farming are heartily disliked by most farmers. Yet this type of farming is inevitable. Most of these large units are going to require the full time services of a veterinarian. They may replace many other herds or clients of the practitioner, clients destined to disappear in the march of progress anyway. One of the most interesting factors observed with the advent of Fashion Farms in central Iowa is the stepped up, stimulated interest in production testing of dairy herds in the surrounding counties. This enterprise alone has done more to create interest in this phase of dairying than 20 years of education and promotion.

Health Economics

Will similar units replace many other herds? Will there be less work for large animal practitioners? Will multiple farrowing units in swine production where from several thousand to over 100,000 (one reported to have production geared at 500,000 per year) will be raised a year replace the swine producer that farrows 200 a year? Is contract cattle feeding of several thousand in a lot replacing the midwest feeder who feeds less than a 100 head every year? Is large animal production going the route of the broiler industry? These are questions confronting large animal practitioners.

Further thought for the practicing veterinarian in large animal production is the fact that almost every graduate in veterinary medicine this year had several job opportunities. The majority of them had several to choose from. Most opportunities were available in large animal practice. Estimates of the graduates in veterinary medicine in 1959 in the United States show that less than one-half selected large animal practice. This does not meet the demand.

These changes give sobering thoughts to many veterinarians. However, it is extremely difficult at times to point out that eventually in large animal practice integration and contract animal production will be very popular. These units will require veterinary service, many of them the full time services of a veterinarian. Also, many will side step the need of veterinary service. Eventually they will see the need of preventative medicine in large animal practice. The technic for doing this will depend upon the local situation and the veterinarian involved.

Bovine Condyloma

Several conditions in animals classed as malignancies are definitely of a viral origin. Included in this grouping are such ailments as the avian leukosis complex (lymphomatosis, myeloblastosis, erythroblastosis); sarcoma of fowl; mouse mammary carcinoma; mammalian papillomatosis; mouse leukemia, bovine condyloma etc.

Veterinarians are frequently called upon to treat so called foot rot in cattle. This condition is usually ascribed to filthy feeding lots, and contributing factors followed by infection with *Spherophorus necrophorus*. There is no reason to doubt the implication of the various factors and the necrophorus infection, but on the other hand the condition known as bovine condyloma—this is a hyperplasia of the papillary layer of the skin in the interdigital space—has been demonstrated to be etiologically of a viral nature, and therefore infectious.

It is also important to bear in mind that an unequivocal relation between the foregoing condition and human condyloma acuminatum—a viral papillomatosis arising from venereal warts that usually undergo change to epidermal carcinoma and metastasize has been established. There is also good reason to believe that the papilloma on the penis of the equine has given rise to typical carcinoma of viral nature.—*R. R. Dykstra, D.V.M.*

INTRA-HERD TRANSMISSION OF MUCOSAL DISEASE

CASE REPORT

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THE first detailed description of a disease condition of cattle under the term Bovine Mucosal Disease (BMD) was made by Ramsey[1] in 1953. Following this report, descriptions of similar disease entities of cattle have been presented. Extensive information pertaining to the symptomatology and pathology of this disease complex has been published.

One of the problems confronting those associated with the livestock industry and disease control has been lack of information pertaining to means of intra- and inter-herd spread of mucosal disease.

Experimental housing facilities consisted of concrete pens 10 ft. by 12 ft. with 4 ft. walls located in one unit.

In general the experimental procedure consisted of isolating mucosal suspects in one of the pen units as distant from the experimental animals as space permitted. Usually spacing consisted of placing the infected animal and the experimental animal at opposite ends of the unit.

Drinking water was supplied in 30 gallon steel drums, which had had approximately 12 in. removed from one end.

Steel pans containing a 4% cresol solution were placed by each pen door to serve as foot baths. All workers were instructed to walk through these baths upon entering and leaving pens.

Stainless steel pails were employed for transferring drinking water from one pen to the other, and were utilized for one experiment only and then autoclaved.

All pens were steamed and washed in a 4% cresol at the completion of each experiment.

Where the terms *typical symptoms* and *pathology* are utilized in this report, they indicate that observations were like or very similar to those referred to in former reports[2,3] unless otherwise stated.

Intra-Herd Transmission

Case M-11. The source of infective material was an 11-month old registered Angus heifer exhibiting typical acute symptoms of BMD. Postmortem lesions presented typical lesions of BMD. This animal was the second animal to be lost in a herd for which the final history recorded 33 head lost with typical symptoms and pathology of BMD. The total herd included 408 head of various ages.

Two castrated male Holstein calves (889-890) four months of age were placed in a pen on the opposite end of the housing unit from the infected animal, and received water from a barrel used as the water supply for the mucosal infected animal. Approximately 15 gallons of water were removed from the infected pen to the experimental animal pen each day. Seven days following first exposure to this water, the two experimental animals exhibited symptoms of mucosal disease. Their symptoms included anorexia, temperature elevation of 104.4 to 104.6 F., rapid dehydration and diarrhea. Temperature elevation, anorexia and diarrhea continued for 36 hours. Oral ulcerations appeared in both calves approximately 72 hours following onset of symptoms.

A female Holstein calf (891) was placed in the enclosure with the two experimental calves ten days following their first exposure to infected water. Eight days later this calf exhibited symptoms of mild BMD. Oral ulcerations appeared 12 days following initial exposure.

No experimental calves died. Postmortem examination of 889 and 891 following electrocution revealed typical lesions of BMD, including ulcerations of the oral cavity, esophagus and abomasum. Examinations were made 21 and 23 days, respectively, following initial contact with infected animals.

Case M-13. Infective materials were procured from an 11 and a 13-month-old registered Angus male from the same herd as described in case M-11.

Four Hereford, castrated male calves, (319-320-321-323), four to six months of age were placed within the same enclosure as the infected calves. The same source of feed and water was available to all animals in the enclosure. The two infected animals died three days following addition of the experimental animals.

Eleven days following initial contact, Hereford 321 exhibited symptoms of lacrimation, elevated temperature (104.8 F.), anorexia, diarrhea and depression. This animal was moved to a pre-selected disinfected pen. Approximately six gallons of water was removed from the watering tank each day for five days, placed in the watering tank of an isolated pen containing a seven month old Holstein, castrated male calf (313).

Nine days following the initial addition of water of the infected calf (321), symptoms of BMD appeared, including elevated temperature (107.4 F.), anorexia and diarrhea. Oral ulcerations were definitive within 90 hours following initial appearance of symptoms.

Calves 319 and 323 presented symptoms of BMD 12 and 14 days, respectively, following initial contact. Oral lesions appeared within 12 days following the onset of symptoms. Calf 320 exhibited no symptoms over an eight week period following exposure and was later placed on pasture for the summer months. No symptoms or oral lesions were observed over this entire period.

Case M-46. The source of infective material was case number 6-597, a Shorthorn calf exhibiting typical symptoms and lesions of mucosal disease with the exception that no oral lesions were present. This calf came from a herd of 109 Shorthorn and Hereford

crossbred beef cattle from which three animals had been lost with typical symptoms of BMD, as described by the owner.

Two gallons of water from the watering tank of the infected animal were removed daily for five days, following the arrival of the calf, and placed in the tank of an experimental calf (162). The experimental calf was a four and a half months old, Holstein-Hereford cross, castrated male. Twelve days following first contact with the water from the infected pen, the experimental animal exhibited symptoms of BMD. Oral ulcerations were not evident at any time following onset of symptoms.

The infected calf (6-597) died seven days after the beginning of the experiment. Postmortem examination revealed typical lesions of BMD with the exception that no oral ulcerations were presented.

Water was removed from the watering tank of experimental calf 162 following the onset of symptoms (approximately two gallons per day for six days) and placed in the water trough of another experimental calf (163). This calf was a Holstein-Hereford cross heifer, five months of age. Symptoms of BMD appeared eight days following initial contact with infected water, and remained for 36 hours. No oral lesions were visible at any time during a three-month observation period.

Water was removed from the watering trough of calf 163 (one gallon a day for three days) following the onset of symptoms and placed in the trough of an isolated enclosure containing a castrated Holstein calf, five months of age (164). Symptoms of mucosal disease appeared in calf 164 seven days following initial contact with the water of the infected calf (163). Symptoms included lacrimation, dehydration, salivation, and mild diarrhea. No oral lesions were observed. The symptomatology was transitory only and existed for approximately 24 hours.

Calf 164 was electrocuted. Postmortem examination was performed 26 days following the onset of symptoms of BMD. Postmortem lesions included minute esophageal

Symptoms of mucosal disease include depression, lacrimation, salivation, nasal discharge, crust formation about the nares and muzzle, rapid and extensive loss of weight, with a gradual development of a hyperkeratosis over the neck and shoulders.

ulcers, typical abomasal ulcers, with hemorrhage and edema of the ileocecal valve. Catarrhal enteritis was present with intestinal hemorrhage and ulcerations throughout the entire intestinal tract. No oral lesions were observed.

Case X-35. An eight-month-old Hereford male had water withheld for 48 hours. Nasal cavities were scarified with a stiff wire brush and the animal was then allowed to drink from a container of water to which had been added 40 cc. of a nasal washing from an animal exhibiting typical symptomatology and pathology of BMD. The procedure was repeated 72 hours later. A mild diarrhea was noted 16 days following first exposure. Temperature remained normal and no nasal discharge was detected. Diarrhea became progressively more acute for the next 72 hours and then subsided. Postmortem examination 52 days following initial exposure provided typical pathology of BMD. Considerable weight loss was observed.

Case X-48. The experimental animal was an 18-month-old castrated Holstein. Nasal passages were scarified and then flushed with nasal washings obtained from a typical BMD case. The procedure was repeated 48 hours following initial nasal inoculation. The highest temperature observed was (104.1 F.) 14 days following the first nasal washing. Red blood count and W.B.C. were made seven days previous to inoculation and for 32 days following inoculation. No significant hematological variation was observed. No noticeable weight loss, diarrhea, or nasal discharge was detected throughout the observation period. Blood obtained previous to inoculation was negative for BMD neutralizing antibodies. Blood taken 23 days following inoculation was positive for BMD antibodies. Necropsy observations indicated few lesions usually observed for BMD.

Cases M-10, M-22, M-23, M-31 and X-43. The source of infective material was animals exhibiting typical symptoms and lesions of BMD. Attempted transmissions were made in the same manner as described under cases M-11, M-13, M-16 and X-35. In all cases transmission was apparently unsuccessful on the basis of symptomatology. Infected animals in each case were in the advanced stages, exhibiting complete anorexia and extensive depression. Observations indicated that infected animals were beyond the stage of desire for water or of slobbering in the water source, thus the infectious agent was not dispersed from the oral or nasal orifices.

No serological neutralization examination of blood was made of experimental animals previous to contact with water from the infected animal. Consideration must be made of the possibility that the experimental animals were immune to the agent or agents present in the animals exhibiting symptomatology and pathology of mucosal disease.

Summary

The transmission of the mucosal disease agent to experimental animals is inconsistent when based on observation of clinical symptomatology.

One of the methods of intra-herd spread of BMD is through the drinking water and possibly through feed.

Acknowledgment

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Immobilization of Captive Wild Animals

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THE DIFFICULTY of performing routine diagnostic, therapeutic and research procedures on intractable animals is well known to practicing veterinarians and investigators utilizing wild animals for research. Popular restraining methods risk injury to valuable specimens and are time-consuming. Tranquilizers are frequently needed in large doses, must often be given in the feed, and require a lengthy latent period before taking effect. Moreover, restraining methods must frequently be resorted to on tranquilized animals. Ideally, a drug which, (1) has a rapid onset with a minimum amount of side effects, (2) is rapidly eliminated from the system, (3) is easily manageable, (4) has no undesirable side effects and (5) paralyzes the animal to an extent that handling is possible, is then the drug of choice.

This preliminary report concerns our experience with succinylcholine on captive wild animals. Since its synthesis in pure form by Lowe and Tammelin,[9] there have been numerous reports of its use in human medicine. Succinylcholine was first reported as a tool in veterinary surgery by Hall.[6] Hall and Weaver[8] reported its use as a muscle relaxant in 400 dogs, and Hanson and Edlund[7] established dosage levels for the dog. Belling and Booth[1] reported that the dosage in horses ranged from 0.03 to 0.09 mg./lb. body weight depending on the route

of administration. The drug was capable of abolishing the spinal reflex but had no direct effect on blood pressure. Martin[10] indicated the dose for cattle to be 1/10 the dose recommended by Belling and Booth[1] for horses. Stowe[12] pointed out that apnea was only transitory in 30 horses when the dose did not exceed 0.2 mg./kg. body weight. Hanson[6] and Hanson and Edlund[7] presented observations on its use for casting cattle. Peters[11] used a dose of 5 mg./100 lb. body weight satisfactorily on caribou in Newfoundland. Black[3] used this drug to capture Black Bear in New York State with reasonable success, utilizing 25 mg./100 lb. body weight. There have, to our knowledge, been no other reports of its use on feral animals.

Materials and Methods

Succinylcholine acts rapidly at the myoneural junction, producing an intense muscular relaxation. Its rather short duration of action has been attributed to its hydrolysis by plasma cholinesterase.[9] It appears to be noncumulative, probably due to its rapid hydrolysis. When determining doses empirically, increased doses can be administered in relatively rapid succession. Since the paralytic dose for the animals used in these trials was not known, initial doses were small and final mg./lb. body weight doses which produced paralysis were arrived at by gradually increasing the dose. A standard solution of 20 mg./cc. was used and diluted with water when dilation was necessary. In all cases the drug was administered by an automatic projectile syringe delivered by a gas (CO_2) operated rifle and/or pistol.[4,13] Animals used in the experiment are listed in table 1; the weights given for the lion and tiger are estimates. Although no respiratory difficulty was encountered while employing this muscle relaxant, it was anticipated. Ideally, equipment to provide artificial respiration should be kept on hand for immediate use if necessary.

Since dosages and reactions of animals used varied, they will be considered individually.

Case 1. An adult male lion (*Felis leo*), weighing approximately 200 lb. was tranquilized. Dosage levels were started at 30 mg. of succinylcholine and gradually increased at 1 mg. increments until effects could be observed. At the 40 mg. level the animal became slightly groggy and in 12 minutes partial paralysis of the tongue occurred (figure 1), which disappeared five minutes after onset. Six minutes after an injection of 52 mg., ascending paralysis began to appear. Paralysis was preceded by a slight tremor, principally of the hind quarters, followed by almost complete paralysis of the limbs. The head became unsteady and the animal was apparently incapable of exerting the usual force with its jaws. Respiration increased slightly; the animal took more frequent, shorter breaths. Thirteen minutes after the 52 mg. injection, skin reflexes were abolished. At this dosage (figure 2) there was no evidence of respiratory difficulty; however, the animal became incontinent of urine and feces in this stage of paralysis. The skin and eyelid reflexes returned five minutes after they were abolished, indicating a return to normal. Paralysis appeared to leave the region of the head first and recovery continued in a posterior direction. Recovery was usually complete 35 to 49 minutes after a paralyzing injection. At no time during this period did the animal appear to experience respiratory difficulty.

Case 2. An adult male tiger (*Felis tigris*) weighing approximately 180 lb. was tranquilized. A 62 mg. dose produced only a slight paralysis. The tiger became ataxic six minutes after the injection. Use of limbs was not completely lost. No paralysis of the tongue such as was observed in the case of the lion was evident, and although the animal was immobilized, partial control of the limbs remained. The animal could move only in a crouching position. Paralysis was of an ascending type, but control of the head was retained at this dose level. Like the lion, however, there was urinary and fecal incontinence. There was no indication of respiratory difficulty, nor were skin or eye reflexes lost. Recovery occurred 20 to 30 minutes after the initial injection.

Case 3. An adult male fallow deer (*Dama dama*) weighing 95 lb. was treated. Approximately 3 mg./100 lb. body weight was enough to completely paralyze the deer

without incurring respiratory difficulty. No excitement occurred before paralysis began. This lack of excitatory stage has a particular advantage since it reduces the hazard of injury to animals during trials. The latent period of succinylcholine in deer, however, is somewhat longer than the latent period in other animals cited in this report. Approximately nine to 12 minutes elapsed before the onset of symptoms. Paralysis was sudden, causing the animal to collapse. There was no fecal or urinary incontinence.

Case 4. A ten-month-old female eland (*Taurotragus oryx*) weighing 200 lb. was tranquilized. This animal required 5 mg. of succinylcholine and seven minutes to become completely paralyzed. Prior to paralysis a slight tremor was observed in the muscular area where the drug had been injected. Paralysis of the extremities was complete. There was no respiratory difficulty, and the skin and eye reflexes remained intact during the entire period of paralysis. There was no indication of loss of fecal control as occurred in the carnivorous animals. Forty minutes after the initial effective dose recovery was complete.

Case 4. An adult male Zebu (*Bos indicus*) weighing 1,020 lb. was tranquilized. This animal was immobilized for hoof trimming with 55 mg. succinylcholine. The initial dose of 10 mg. was increased in 10 mg. increments to 30 mg. At this point the dose increment was changed to 5 mg. and at 55 mg. the effects of the drug were apparent. In approximately seven minutes the animal went down as it would in assuming a position of normal recumbency. All reflexes were entirely normal. Hoofs were trimmed and the animal was placed on an improvised scale and weighed. In 23 minutes control of the limbs returned and sternal recumbency was maintained in 30 minutes. The Zebu remained down for one hour and six minutes, although it was believed that with an increased stimulus the animal could have gotten up sooner.

Discussion

In all the above cases the most important feature of this drug was the complete absence of an excitatory period. All animals went down quietly and remained quiet during and after treatment. In this respect the drug differs from most others used for the purpose of temporarily immobilizing animals. A rather wide range of safety was noted with this drug when used on animals requiring a high mg. per unit body weight dosage. When used on deer and antelope where the total dose is rather low (3-5 mg. per 100 lb.) the margin of safety lessened. Overdosage is manifest by beginning paralysis of respiratory muscles, a condition which may be overcome by artificial respiration in a relatively short time.

The writers are not able to report exclusively on overdosage at this time but hope to establish the range between desired action and overdosage in future trials.

It is believed that larger animals would present a complex problem if a method of artificially controlling respiratory movements were not available. However, intratracheal intubation technics and controlled oxygen administration seem entirely feasible. No apparent side effects were observed during these preliminary trials. In all cases the onset of drug action was rather rapid

TABLE 1. Paralyzing Doses and the Duration of the Latent, Paralytic and Inoculation to Recovery Periods of a Single Typical Episode with Succinylcholine in Animals Used in this Report

	Sex	Age	Weight (lb.)	Total Dose (mg.)	Mg./lb.	Latent Period (min.)	Duration Paralysis (min.)	Elapsed Time from Inoc. to Final Recovery (min.)
Felis leo	M	9 yr.	200*	52	0.260	6	12	49
Felis tigris	M	10 yr.	180*	62	0.344	6	4	26
Dama dama	M	Adult—Unknown	95	3	0.031	11	10	25
Taurotragus oryx	F	10 mo.	200	5	0.026	7	20	40
Bos indicus	M	18 yr.	1020	55	0.053	7	16	66

*Estimated weights.

and recovery was also rapid.

Because of the rapid recovery noted, it must be remembered that additional doses will be needed, if necessary, to keep the animal down for any extended period. Additional doses could be administered by hand syringe either intramuscularly or intravenously or by an intravenous drip. No cumulative effects of the drug were evident in these cases. When dosages were being estimated, it was possible to repeat an injection within 30 minutes up until the time when the paralysis became evident. It would then be necessary to wait until paralysis began to wear off before additional doses were given.

With this drug it was possible to perform such routine procedures as removing antlers, trimming hoofs, cutting ingrown claws on large cats, removing foreign material from feet or hide, taking blood and urine samples, administering intravenous medications, and performing close examinations of the head and adjacent parts usually inaccessible unless the animal is anesthetized.

Once it has been determined that the animal is not overdosed and there is no apparent respiratory difficulty, the animal may be put into a crate and allowed to recover. In this way movement and crating of animals is greatly simplified in addition to eliminating injuries to the animal and keeper.

It must be realized that this preliminary report consists of few species and individuals on which the drug was tried.

All treatments were given from short distances, using the projectile type syringe. It is possible to deliver these projectiles from distances up to 50 yards, which opens the area of use in the field of capture by temporary immobilization of most wild species.

No failures in equipment were experienced. Every syringe which penetrated an animal delivered its entire calculated dose as anticipated.

Summary

1. Preliminary trials using succinylcholine chloride to produce a temporary paralysis in five species of captive wild animals are reported.

2. Succinylcholine produces a flaccid paralysis of the skeletal muscles apparently without an excitatory component, either before, during or after paralysis.

3. It was determined that there were variations in doses required per pound to produce paralysis in the different species studied.

4. No visually apparent side effects were encountered.

5. No cumulative effects were noted in these trials.

Acknowledgment

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Here each month are published ideas, suggestions and comments picked up by VM reporters at veterinary meetings.

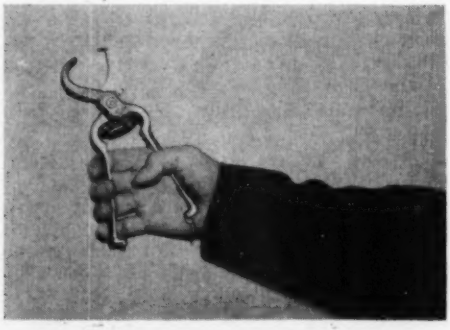
The Meeting Circuit

Alfalfa Bloat

TWELVE TRIALS were reported by H. H. Van Horn, Jr., and E. E. Bartley, Kansas State University, which support the theory that saliva (mucin) prevents bloating by preventing the formation of a stable froth and by permitting gas to escape from frothing rumen contents.—*54th Dairy Science Association Meeting.*

Gadget Night

GADGET NIGHT at the Kansas City Veterinary Medical Association yielded an interesting assortment of hooks, snares and various devices each member had designed to help him accomplish practice routine a little more easily.



Adaptation of pruning shears as a castration tool was described for simplification of this mass production procedure. One blade is ground to resemble a standard hoe blade castration knife. In the closed position the point contacts the blunt nose tip from the opposite side. This instrument is used to punch a scrotal incision with one squeeze. The process is carried out on both sides of the median raphia; spermatic cord and vessels are drawn through the incisions for routine emasculation.

Equine Founder

DR. S. K. HARVEY told Michigan veterinarians that he varies his treatment for equine founder. For green grass laminitis where hoof ridges are even, he uses no purge. He gives U.S.P. Alum, 2 oz., in a quart of warm water for two days and places feet in cold water and ice. Antihistamines work best in acute laminitis. If fever is high, antibiotics are used. Steroids are used in some cases. In overfeeding, purgation is carried out with Reek's capsules, mineral oil, or Mild Glaubers Salts. Keep the feet in a boot with ice.—*Michigan State University, Winter Short Course.*

Enteritis of Turkeys

TRANSMISSIBLE enteritis of turkeys is described under various names including avian monocytosis and bluecomb disease because of a similarity to a diseae of chickens known under these names. Transmissible enteritis has been suggested as the most appropriate name for the disease of turkeys by Sieburth and Johnson (see *Poultry Science* 36:256, 1957). It is also known by such local names

as mud fever, Merced disease and nonspecific enteritis. In young poults it has also been confused with hexamitiasis because of many characteristics in common to the two diseases. It is now generally accepted that the cause is a filterable agent and probably a virus.

The disease affects susceptible turkeys of all ages, without regard to season, especially on farms that practice a continuous rearing program. In young poults the first signs of the disease may appear as early as the fourth or fifth day after exposure and produce from 10 to 100% mortality. As stated above, the clinical signs are similar to those seen in hexamitiasis and include listlessness, tendency to seek heat, subnormal temperature, watery droppings and rapid loss of weight. Because of the similar clinical signs, the two diseases must be differentiated by demonstration of their respective etiological agents. Because of the similar age range of susceptibility, it is highly probable that combined infections may occur. In growing turkeys, rapid onset, sudden drop in feed and water consumption, listlessness, rapid loss in weight, and cyanosis are characteristic clinical manifestations. Droppings become watery and brownish in color.

Postmortem findings are not too significant. The spleen is often smaller than normal and the pancreas appear chalky white and show pinpoint areas of degeneration. Intestinal contents become watery and foamy, and there may be mucous casts.

Diagnosis must be based on history of the outbreak, elimination of diseases causing similar clinical signs and pathological changes, and finally should be confirmed by isolation of the causative agent. Utilization of competent diagnostic laboratory service is essential in arriving at a correct diagnosis.

Reports on treatment have been conflicting but it is generally agreed that losses in field outbreaks can be reduced by use of antibiotics. Sieburth and Pomeroy (see *Journal of the American Veterinary Medical Association* 128:509, 1956) emphasize the importance of dosage in the treatment of the field syndrome. They suggest 500 gm. of an antibiotic like chlortetracycline per ton of feed or 250 parts per million in drinking water.

Prevention consists in following the usually recommended procedures for handling contagious diseases. The reader is referred to such recently revised text books on poultry diseases as Barger, Card and Pomery fifth edition, 1958; and Biester and Schwarte, fourth edition, 1959, for more detailed discussions on both Transmissible Enteritis of Turkeys and the comparison disease Avian Monocytosis of Chickens.—*W. R. Hinshaw, D.V.M.*

Removal of Placenta in the Mare

A TECHNIC for removal of afterbirth in the mare is described by Smith in the June 1958 issue of the *Irish Veterinary Journal.* The technic described calls for the operator to place his hand in the center of the afterbirth and extend his arm as far into the horn of the uterus as possible. When the apex of the horn is reached, placental membrane is pinched up into the hand. The hand is then gently withdrawn, thus inverting the placenta. If placenta is removed within 12 hours after foaling, subsequent treatment is not necessary.

Fetal Leptospirosis

ABORTION is recognized in several countries as an important sequel of leptospirosis of pregnant cattle according to a report from the *Journal of Infectious Diseases,* (120:227, 1958). Field observations indicate that leptospiral bovine abortion occurs primarily in the last trimester of pregnancy, and most often two to five weeks after exposure; the dams are usually serologically positive and asymptomatic at the time of abortion, and abortion is often the only clinical manifestation of leptospirosis.

Six immunized cattle in the eighth month of pregnancy were laparotomized and inoculated intraplacentally with *Leptospira pomona, sejroe,* or *saxkoebing.*

Two cows aborted on the 12th day after inoculation with *L. sejroe,* and one cow on the 14th day after inoculation with *L.*

pomona. Fetal death was diagnosed in one heifer on the 6th day after inoculation with *L. pomona*, and the dam was sacrificed a few hours later. The bacteriological and pathological evidence indicated that the fetuses had died from fetal leptospirosis, and this disease appeared to have been the only cause of fetal death and abortion.

Gross and microscopic lesions of the aborted fetuses and their membranes were similar to those reported in experimental and naturally-occurring cases of bovine abortion. Leptospires were demonstrated in silver-impregnated sections of liver and kidney from all three aborted fetuses, whereas attempts to isolate leptospires from various fetal organs and body fluids failed in most instances. The fetus delivered by sacrificing the dam showed no evidence of autolysis, or of hemolysis; otherwise the fetal lesions were similar to those of the aborted fetuses. The fetal membranes were markedly edematous, but the cotyledons were histologically normal. Leptospires were isolated from all organs and body fluids examined from this fetus.

Two cows gave birth to slightly premature calves on the 41st and the 47th day after inoculation with *L. saxkoebing*. The serological and pathological evidence indicated that the calves had produced specific antibodies *in utero* in response to fetal *L. saxkoebing*.

From these findings and previously reported observations the following conclusions were drawn:

1. Leptospiral bovine abortion is usually the expulsion of a fetus that has died from fetal leptospirosis developed after leptospiral penetration of the placental barrier during maternal leptospiremia. The interval of two to five weeks most often observed between exposure of the dam and abortion is explainable by the two consecutive infections involved.

2. The interval between fetal death from leptospirosis and expulsion often exceeds the survival-time of leptospires in the dead fetus *in utero*, particularly in heifers. The use of silver-impregnation methods often permits the demonstration of leptospires, viable or non-viable, in aborted fetal material.

3. Occasionally, bovine fetuses are able to produce specific antibodies and survive intrauterine leptospirosis in the eighth or ninth month of pregnancy.—*K. L. Fennestad and C. Borg-Petersen, The Royal Veterinary and Agricultural College and Seruminstitut, Copenhagen, Denmark.*

Avian Hepatitis

THE OHIO DIVISION of Animal Industry, reporting in the December 1958, issue of *Animal Disease Trends* indicates that avian hepatitis is frequently observed in laboratory examinations. This laboratory has also observed a case of vibrious hepatitis clinically indistinguishable from the virus form. The vibrio was cultured from the bile and affected liver tissue.

Experimentally, the inoculation of this vibrio into young chickens resulted in typical symptoms of hepatitis. General clinical evidence of hepatitis are decreased egg production, listlessness, pale comb and wattles, and some weight loss, although food consumption appears to remain normal. The mortality rate is from 5 to 10%, chiefly in laying flocks, though broilers and turkey flocks are occasionally affected.

Reports indicate that in the prevention or treatment of the disease there is a good response to the use of either furazolidone (NF 180) or dihydrostreptomycin sulphate. —*R. R. Dykstra, D.V.M.*

Frozen Semen

THE USE of frozen semen for artificial insemination of cows is decidedly on the increase especially as an adjunct to a fluid semen program. By means of dry ice the semen may be frozen at a temperature of —109 F., or if liquid nitrogen is the freezing medium, semen may be frozen at —320 F. If the bull furnishing this semen is a vigorous breeder settling a high percentage of cows following a natural service or the use of fluid semen in artificial insemination, then frozen semen is apparently as potent. This product may be used months or even years later. Sometimes after the sire has died.

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Veterinary Nutritional Consultation on Hospitalized Dogs

MARK L. MORRIS, D.V.M.
Topeka, Kansas

THE PRACTITIONER concerned chiefly with the practice of small animal medicine is frequently confronted with cases that demand therapy which is nutritional in nature. Cases such as those presented below are at least typical, if not common problems in the average small animal clinic.

Case 1

A male Boxer pup, three months of age, is presented with a compound fracture of the middle third of the femur. The fracture resulted from an automobile accident. This pup arrived late in the evening in a state of semi-shock, and has been given blood, fluids, a sedative, and temporary first aid to immobilize the fracture. The animal was then placed in a cage of suitable size. The question now presents itself: How much blood has been lost? What is the state of hydration and the electrolyte balance?

Suggested laboratory procedures involve determination of (1) total red blood cells, (2) hemoglobin, (3) hematocrit and (4) packed red cell volume.

The hematocrit of a normal puppy at this age should be about 45 to 50. If the hematocrit is down, possibly from acute bleeding, concentration should not have taken place.

Hematocrits in dogs vary somewhat in different areas of the United States, thus the normal reading should be kept in mind for any particular area. If this puppy is in a state of shock and there is evidence of dehydration, loss of plasma volume with hemo-concentration, a transfusion could be dangerous since it would increase the viscosity of the blood. This puppy should receive normal electrolyte solution intravenously by drip for proper rehydration. Frequent hematocrits while hydrating are indicated. When the hematocrit declines, or if it should fall below 40, a transfusion should be administered to the pup to provide the necessary blood components, bringing the body into physiological equilibrium. When the puppy is out of danger, a microscopic examination of the feces for intestinal parasites should be made. Further information can be obtained on the hydration of this Boxer by examining the specific gravity of the urine. When the puppy is properly hydrated, the specific gravity of the urine will be within the normal range of 1.030 to 1.040.

This report is a condensation of two papers presented at the 36th Annual Postgraduate Conference for Veterinarians at Michigan State University and at the Maryland State Veterinary Medical Association meeting in Baltimore, both in January 1959.

Principles of Dietary Management

In evaluating the physical status of this pup, it is necessary to obtain a reasonably accurate dietary history from which can be

estimated the probable physiological condition at the time of injury. This is important. At three months of age the animal is near the height of the growth stress cycle. There are heavy demands on tissue reserves for critical dietary components, *i.e.*, amino acids, vitamins and minerals. This patient could fall into either of two classifications: (1) the depleted pup, or (2) the well repleted.

Dietary history should be evaluated. This can be done qualitatively or quantitatively. In most instances it must be done qualitatively based on information obtained from the owner. The veterinarian must then rely upon his experience and judgment in making a fair appraisal of the physiological status of the patient. Dietary intake previous to injury can have an important bearing on the present physiological state of the dog.

Many puppies which have been consuming commercial dog foods, dry or canned, unsupplemented with high quality protein from meat, eggs or milk products and not eating after an injury are frequently in negative nitrogen balance within 24 to 72 hours. This interferes with recovery from shock, delays callus formation, interrupts tissue repair, thus complicating management of the case. The same puppy fed a well balanced diet including high quality protein with adequate digestible energy can remain off food for several additional days before negative nitrogen balance develops.

The diet for this animal should, therefore, consist of high quality protein to maintain and rapidly replete falling body reserves. Adequate amounts of digestible energy from well dextrinized carbohydrates and plenty of fat should be fed. This has a sparing action on dietary protein and will aid the body in repleting the diminishing stores.

Vitamins and minerals are important. This is commonly recognized, however. A common mistake is the addition of a teaspoonful of calcium gluconate to a diet already overloaded with minerals in that it will be of little aid in calcification and may actually delay it. What is needed is a balanced diet, one in which calcium-phosphorus levels have been properly established and keyed for growth. An excessive quantity of vitamin D is also contraindicated. Overloading the patient with vitamin D can have a harmful rather than a beneficial effect. The principles expressed above are also subject to variations because of breeds.

These basic nutritional principles have been employed in the formulation as well as chemical and biological testing of the Prescription Diet (p/d — Hill Packing), which is designed to properly nourish an animal such as this Boxer pup.

Case 2

A Saint Bernard, nine years of age, has been struck by an automobile and is presented with multiple fractures of the pelvis. Hospitalization for several weeks will be necessary. It is also necessary to determine the extent that chronic constitutional disease complicates the fracture.

If possible, a 24 hour specimen of urine should be obtained. The following should be determined: (1) specific gravity, (2) Ph, and (3) sediment for blood, pus cells, bacteria and mineral crystals.

In collecting this urine sample, it should be remembered that there may be injury to the bladder as a result of the pelvic fracture. This could complicate interpretation of the findings. Additional tests will aid. For example, a urine bilirubin, and a quantitative determination for the amount of uric acid eliminated will give a lead on the possibility of liver malfunction in this old dog. A blood urea nitrogen is very essential, especially if the specific gravity of the urine is below 1.020.

Anemia is common in old dogs. It can be detected by an increased sedimentation rate and a lowered hematocrit. If there is evidence that the dog may have some active infection, a total white blood cell count and examination of a stained smear for a differential count would be important. If the findings on this dog indicate a urine specific gravity below 1.020 and a blood urea nitrogen above 40 mg.%, kidney impairment is possible. Whenever the LaMotte method is used, findings of 50 or above are significant. If there is evidence that this old dog may have extensive liver damage, this may be detected by the presence of fat in the plasma, increased sedimentation

rate, lowered hematocrit, increased bilirubin in the urine, and/or an increase in the total urine uric acid. When hospitalized, and especially if any surgical repair of the fracture is attempted, this animal may develop complications.

Physiological Status

In evaluating the physiological status of this patient, the dietary history may indicate the dog has been fed a dry commercial meal. Little supplementation with high quality protein sources may be evident. It will therefore require an estimated four to ten days for the dog to develop either nitrogen equilibrium or a negative balance. If this dog had been fed a pound of horsemeat per day, some cooked egg or milk products, then one might anticipate that 20 or more days may be required for the body to develop negative nitrogen balance. When this old dog is restricted to a cage to aid healing of the pelvis, the total daily dietary energy requirement will go down, thus the animal will eat less food than at home. There is also a psychic factor to be considered in maintaining an older animal away from home.

There is limited growth of tissue in an animal of this age, thus the veterinarian should watch this patient carefully. The dog will consume insufficient dietary energy to meet body demands. After two or three weeks of hospitalization, complications may appear. These are decubital sores on the skin, loss in weight, changes in the skin and coat. The hair may become dry and lose sheen. *X*-ray examination of the pelvis may reveal slow to poor healing. Constitutional changes such as chronic interstitial nephritis, chronic interstitial hepatitis or poor pancreatic function may cause further complications.

Older animals have an increased calcium requirement. To overload them with calcium supplements is contraindicated because it may encourage phosphorus depletion, and instead of aiding callous calcification, it can retard it. The diet fed this patient should therefore be one specially designed for the mature dog with all of the individual patient's constitutional defects taken into consideration.

Practicing veterinarians for the past ten years have been employing the Prescription Diet (k/d) in clinical management of cases such as this Saint Bernard.

Case 3

A spayed, obese Cocker Spaniel, seven years of age, with a chronic skin disease is presented. This dog has been in and out of the hospital frequently for three years. External applications have been applied and repeated injections of cortisone have been administered. Numerous changes in diet resulting in temporary relief have been tried. This is another patient in which chronic constitutional pathological changes may be anticipated. It is necessary, therefore, to consider this case in some detail in order to make an accurate differential diagnosis.

As one of the first procedures, a complete urine study should be made on this animal. In addition to the tests suggested for the previous case, it would be well to check a urine sample for sugar and acetone. Diabetes melitus or insipidus are rather common in obese animals and should not be overlooked. If sugar is found in the urine, an examination of the blood should be made for glucose. Blood should be examined for urea in order to rule out the presence of interstitial nephritis. The hematocrit should be carefully examined to ascertain whether fat lipids are present. In examining these samples, a white ring at the top of the tube is good evidence that cholesterol may be present in an increased amount and therefore a cholesterol examination of the blood should be made. It may be desirable to run a protein bound iodide. The results of such a test, considered together with the level of cholesterol in the blood, are a clinical manifestation of a possible hypo-thyroidism.

Cholesterols are considered elevated when above 150. Bollman and Adler of the Mayo Clinic found that the normal serum cholesterol in dogs ranges from 100 to 150 mg. %. In my experience, when serum cholesterols exceed 180-200 mg. %, they are in the pathological range. The dog with a hypo-thyroidism will frequently have a protein bound iodide value as low as 1 — some even as low as 0.8. The normal value

is in the range of 4. Thus, it is possible to make a clinical evaluation of the hypothyroid dog.

Skin tests on dogs to determine the presence or absence of an allergy are of unknown value. Schwartzman at the University of Minnesota has found that skin biopsy sections apparently do not reveal as much information as had been hoped. Skin scrapings will be of value in detecting ectoparasites. Hairs or scrapings can be cultured in suitable media for the diagnosis of fungi.

Dietary History

This patient demands clinical and laboratory diagnoses. A study of the dietary history over a considerable period is indicated. An accurate differential diagnosis will aid materially in formulating a dietary program. Once constitutional defects have been detected, several decisions must be made as follows:

1. Does it appear that the excess fat is a complicating factor? Should the dog be reduced in weight?

2. Is there an endocrine imbalance present? What steps, if any, should be taken to correct it?

3. Is there evidence of a food allergy? Careful work employing an elimination diet technic will aid in determining food substances to which the body may be sensitized.

Liver function may be impaired. Blood plasma may show evidence of excessive fat together with an elevated blood cholesterol. One should conduct some check on the liver function and fat metabolism before determining whether to restrict fat intake. In some instances serum plasma is overloaded with fat. Phillips has found that a restriction of dietary fat to those containing the unsaturated fatty acids, *i.e.*, corn oil, cottonseed oil, is beneficial. If the blood plasma is fat free, then some saturated fatty acids such as lard can be permitted in the diet without deleterious effects. These are qualitative clinical and laboratory procedures but can serve as guides in deciding upon dietary regulations. In most instances, it is desirable to reduce the body weight to normal. This is often helpful.

The Prescription Diet (r/d) has proved of value in the management of such cases. Supplementation with small amounts of unsaturated fats (corn oil) may be helpful, especially if the blood cholesterol level is above the normal range.

Case 4

A female Collie, three years of age, with a body weight of 50 lb. has ten pups seven days of age. The owner notes that this female appears to be losing weight. Careful examination of the pups reveals evidence of malnutrition. The bitch has an abnormal vaginal discharge. Each is weighed when admitted to the hospital. Three days later one-half of the litter had gained little. One pup had lost 2 oz.

One of the most important tests in examining this dog and her pups is to determine the status of the erythrocytes. It is important to know the numbers, the size and certainly the amount of hemoglobin in the red blood cells. The tests of choice here are the hematocrit, the total red cell count and a stained blood smear to permit examination of the erythrocytes. The technician examining such smears should determine whether the cells are well filled with hemoglobin or achromia is present. Frequently, pathological forms of red blood cells are present in large numbers. These consist of shrunken cells, abnormally shaped cells, large numbers of tiny red cells, microcytes, etc. The same blood determinations should be repeated on the puppies, especially if positive on the blood of the bitch.

Assuming that these results indicate a red cell count of four million, hematocrit 35, sedimentation rate (Winthrobe tube) 15 points in one hour — many red cells are microcytic and achromic, and the pack cell volume is lowered. The hemoglobin is 10 gm. The white blood cell count is 18,000. The differential shows some increase in neutrophiles. Blood studies on the puppies show comparable pathological alterations. There is no evidence of acute mastitis.

Puppies with total red blood cell counts below two million, hematocrits in the range of the twenties with a considerable number of abnormally shaped red blood cells, can be considered in serious condition. In such instances, transfusion of the bitch and trans-

fusion of each puppy may fail to save the pups. In most instances, the bitch can be saved. A fecal examination should be made to determine whether the bitch is heavily infected with hookworm. If so, this will further complicate the case and make prognosis less favorable.

The following suggestions are offered for management of this case:

1. Obtain the dietary history of the bitch starting at date of breeding. It should be recorded on a quantitative basis.

2. Determine the amount of food that was given this female and whether it increased during the gestation period, especially during the last 21 days.

3. Was most energy obtained from baked biscuit or dry meal?

4. What meat and how much was fed daily? Did the dog receive liver raw, cooked or in dry form?

Dietary management of this Collie and her pups is urgent. The bitch and the pups should receive liver extract intramuscularly. The bitch should be transfused to build up the hematocrit temporarily until a therapeutic diet can be fed. The pups should receive as a supplement to the mother's milk several drops of freshly prepared liver juice, at least twice daily. Since the bitch and all the pups are depleted, intrinsic factors in liver are needed. These are not supplied entirely by synthetic B complex vitamins. The diet, especially formulated and in concentrated form, should provide for maximum of total digestible nutrients in a minimum quantity of food. It should be fed at frequent intervals (three times daily) to permit the gastro-intestinal tract to cope with the excessive problem of reproductive stress. A well balanced diet consisting of high quality protein at a 25 to 30% (d/m/b level) with balanced fat 15 to 20% (d/m/b) and easily digested carbohydrates is essential.

Supplementary Feeding

It is difficult for the clinician to prepare a ration which will replete the body's stores of essential nutrients in time to save suckling pups. Supplementary feeding of the litter should therefore be started at the earliest possible moment.

In formulating a diet for the bitch it must be remembered that a 50 lb. Collie requires about 40 calories per pound for maintenance of its own body. With ten suckling pups, the requirement is increased nearly three times, or 6,000 calories in 24 hours. A good ration must provide about 600 to 700 calories per pound (moist), thus this Collie should be fed 9 to 10 lb. of diet in three feedings in a 24 hour period.

Dietary management of this case must be keyed to the individual. There are several possibilities.

1. Prescription Diet (p/d) can be fed if the bitch will consume an amount of food sufficient to meet total energy demands.

2. Prescription Diet (p/d) supplemented with raw fresh liver at a 3 to 5% level could be used, particularly if laboratory data indicate presence of marked pathological changes in blood constituents.

3. Basal ration (f/d) reproductive menu may be more effective, especially if the bitch will consume only a limited amount of food. This will permit the feeding of more meat and liver mixture with increased fat so that a ration of higher caloric density, reducing the volume intake, can be fed.

Case 5

A male Boxer, three years of age, with a history of chronic otitis for many months, is presented. The dog is hospitalized for concentrated attention. Clinical care is given the ear. Routine hospital ration is fed and the animal is exercised twice daily. On entry the body weight is 70 lb. On the eighth day the dog looks poorly. Body weight falls to 65 lb. (a loss of 5 lb.). Instructions are given to feed as much as the dog will eat. On the 15th day the weight is 61 lb. There is evidence of depletion, hair change, and the dog looks poorly. The ear has not healed completely. Who is going to discharge the dog and what is the owner going to say? This dog was accustomed to running at large out of doors.

This dog has been screened, employing routine hematology and urine analysis and found to be essentially normal. Weight loss has been determined to be entirely due to a low caloric intake during the period of hospitalization. This patient should receive

a ration especially formulated to meet individual demands. Such a diet should omit large amounts of bulky ingredients of low digestibility.

Total energy demands of the body should be provided for in more concentrated form: an adequate intake of easily metabolized carbohydrate at top level of fat (15 to 20% d/m/b) fed at frequent intervals (two times daily) is necesary. In most instances body weight can be maintained even though confined in a hospital. The most desirable technic is to anticipate the problems and prevent weight loss, rather than correct it.

In the home environment, this dog will maintain body weight on about 2,500 calories, provided the calories are from good, well balanced ingredients.

In the hospital, exercise has been restricted, there is no exposure to low temperatures, therefore the caloric requirement should be less. This Boxer, however, may not be too happy in the hospital; there may be expenditure of nervous energy, thus, the one demand may balance the other and the total energy requirement may be comparable. In the hospital the dog may consume an insufficient amount of food to provide 2,500 available calories. He may eat 2,000 calories, shorting himself 500 calories per day — and this will encourage weight loss.

Field experience has demonstrated that this syndrome can be prevented and if necessary controlled by basal ration (f/d).

In these five cases there are two common factors: accurate diagnosis, and individually prescribed diet. Veterinarians should be constantly aware of the importance of these two factors in the management of a wide range of small animal cases.

Experimental Evaluation of a Dual Vaccine

Tests in dogs of a combined vaccine consisting of modified canine distemper (CD) and modified infectious canine hepatitis (ICH) viruses showed that each viral component produced neutralizing antibodies and immunity if adequate amounts of each virus were given. As measured by titration in eggs, the minimal immunizing dose for avianized CD virus was found to be between 64 and 250, and for tissue-cultured pig kidney ICH virus the $TCID_{50}$ was between 6.3 and 63. CD vaccine virus produced the same neutralizing antibody titer as did virulent virus, whereas ICH vaccine virus produced a lower titer. Virulent CD virus inoculated subsequently did not increase the initial antibody content produced by vaccine virus, whereas virulent ICH virus produced an increase in titer. No signs of illness developed in vaccinated dogs, and unvaccinated dogs placed in contact also remained free from illness.

On the basis of these findings it was concluded that a safe and effective vaccine, which would immunize dogs both against distemper and infectious canine hepatitis by a single inoculation, could be offered as an article of commerce, provided care was taken to ensure not only adequate amounts of each virus but adequate amounts of immunizing virus. One year after vaccination four out of five dogs still had a sufficient antibody titer to protect them against distemper virus. To insure protection for the other 20% that become susceptible it is advisable to revaccinate all dogs 1 year after vaccination with avianized CD virus vaccine. An alternative would be to test a dog's serum for antibodies. If the titer is negative or quite low the dog would then be revaccinated.

A nomograph relating the serum titer of the mother to the age at which her progeny will respond to vaccination for distemper is presented for routine clinical application. The nomograph was field tested with success on 57 dogs from 13 litters where the age of vaccination ranged from four to 12 weeks, and a statistical analysis indicated that use of the nomograph will result in at least 95% vaccination success rate. This procedure could supplant the practice of giving antiserum for temporary protection of young puppies.—*J. H. Gillespie, V.M.D.*,

CLINICAL ASPECTS of Canine Blood Transfusion

CHARLES E. BILD, D.V.M.

Miami, Florida

IN THE CLINICAL PRACTICE OF VETERINARY MEDICINE, the difference between success and failure in a given situation often depends on properly collected and properly transfused blood. Therefore, although blood transfusions never cure anything and never serve as tonics, they are of utmost importance.

When the cost of labor involved in giving proper care to permanent blood transfusion equipment is closely calculated, it is apparent that use of disposable commercial equipment is less expensive than correctly handled permanent equipment.

Practically all the blood we use is collected just prior to the transfusions. We use greyhounds as donors, and we never rely on sedation, anesthesia, or restraint. The blood is always drawn from the jugular vein. Pyrogen-free equipment is always used. It is always transfused intravenously.

We do not cross-match donor-recipient blood for a first transfusion. In the last 1,200 transfusions performed in our clinic, we have observed only two incompatible cross-match reactions during or after the first four infusions in a particular animal. However, reactions arising from incompatibility have occurred after many transfusions. We frequently (approximately

20%) have a hives reaction which we have not considered an incompatibility. Most of the hives reactions are mild and of no consequence. I would expect to find fewer hives reactions when blood is collected from donors in the morning before feeding. When an animal undergoes many transfusions, cross-matching is in order, even if a number of donors are used.

Classical symptoms of incompatible blood transfusion may occur during the transfusion: the recipient becomes somewhat cyanotic, cries out in pain, and shows extreme bilirubinuria in a few hours. I believe that any animal showing severe bilirubinuria with no other known cause the day of the blood transfusion, or the day following, has received incompatible blood. One exception, however, should be noted: in a severe snake bite poison case, I found extreme bilirubinuria after a transfusion, although compatible blood was used. This probably resulted from the destruction of red cells by the snake venom. The blood of the three donors used was checked retrospectively against the recipient's and found to be compatible.

Another exceptional case arose in 1954 at the Florida State Veterinary Medical Association meeting when I demonstrated an incompatible cross-match transfusion. A professional blood bank technician cross-matched my bird dogs and four greyhound donors. One slight incompatibility was found, and this incompatibility was increased by hyperimmunizing the recipient with small amounts of the donor blood. At the time of the demonstration, the cross-match was most incompatible; nevertheless, there was no reaction, either immediate or delayed.

The most severe transfusion reaction we ever found was in an animal that had 26 transfusions within 2½ months. Finally, examination of 12 different possible donors showed cross-matching incompatibility in each case. In this instance, cross-matching studies were accomplished only after severe reactions appeared.

(Incidentally, the writer used a greyhound to demonstrate a sterile but not pyrogen-free transfusion, both intravenously and intraperitoneally, at the Southern Veterinary Medical Association clinic meeting in Atlanta in 1937.)

Medical Usage of Blood Transfusion

Need of blood transfusion is usually accompanied by need of water and electrolytes. Use of fluid electrolytes makes for more efficient use of blood infusion in the dog in acute situations.

1. Treatment for a *very anemic puppy* with a hematocrit of 15 (4.92 gm.) or less is as follows: If hookworm disease is not complicated by coccidia or the distemper syndrome or both, blood transfusion and subcutaneous fluid electrolyte and worming nearly always allow the puppy to play and have a normal bowel movement in 24 hours. The usual dose of ACD blood in the puppy is 10 cc. per pound of body weight. *This represents 8 cc. of whole blood, being approximately 20% of the total blood volume, and is always a safe amount of blood dosage.* The puppy that can be wormed and brought on good feed does not usually need a blood transfusion. Here is the place for clinical judgment. I know of many clinicians who believe that puppies strong

In this report, the fourth in a series on clinical application of resuscitative procedures, the writer covers all phases of clinical blood transfusion technics. In addition to the massive clinical experience reflected in this discussion, completely new and original findings on use of iron therapy and snake bite management will prove valuable to research workers and clinicians alike.

enough to live an hour without treatment can be transfused, wormed and resuscitated with a mortality rate of almost zero. We often infuse blood in the very small puppy via the jugular vein with a 23 gauge ⅝ in. or ¾ in. needle.

The very low hemoglobin level puppy that has severe hemorrhagic diarrhea at the time of the first transfusion may well need 15 or even 20 cc. of ACD blood per pound of body weight and subcutaneous fluid electrolyte. In this extreme situation, it is advisable to then administer 10 cc. of ACD blood per pound of body weight and fluid electrolytes every four hours to keep the blood level up to 35 Hct. (We always use penicillin-streptomycin in these situations.) This seems like the use of much blood and labor but actually is an economical use of both.

Severe Hookworm Conditions

In severe hookworm situations, inefficient anthelmintic usage is the same as no anthelmintic usage. A puppy that is transfused, given fluid electrolytes and then wormed inefficiently often shows no improvement in 24 hours. For these situations we use tetrachlorethylene in the dosage of approximately 1 cc. per seven pounds of body weight and follow in 2½ hours with 1/20 grain arecoline hydrobromide per ten pounds. The puppy is fed lean ground beef two hours after the arecoline. It is then fed at least four times daily. When this problem occurs clinically, the puppy is often dehydrated and under weight, and the usual 1 cc. of tetrachlorethylene per ten pounds of the *dehydrated* body weight is not at all efficient. Dosage in this case should be about 1 cc. of tetrachlorethylene per seven pounds of body weight. However, the clinician can calculate the desirable weight for the puppy in good condition, and then use that weight as a basis for a dosage of tetrachlorethylene of 1 cc. per ten pounds.

A number of dogs treated in my practice were first presented with a hematocrit of ten or less; yet for a number of years they have been exceptionally healthy. Except for the first episode, they have never since needed medication — anthelmintic or otherwise. One of the fascinating aspects of clinical veterinary medicine is that no two cases are precisely alike.

The severe hookworm problem involves more than the transfusion of blood. When hookworm disease in a puppy is not complicated by distemper, coccidia, or both, the problem is a simple one. There has been blood loss (usually this is not apparent in the feces until the terminal hours of a specific case), which means iron and protein deficits. An accurate check of the anemia is the hematocrit, and the capillary erythrocyte sedimentation rate (ESR) is a worthwhile indication of whether the hookworm disease is complicated by other problems. In hookworm disease only, there is practically no sedimentation in a capillary ESR. In the very severe hookworm disease problem of the dog, there is no such thing as building up the animal before worming. Here again the hematocrit and weight recording gives one an excellent over-all perspective of a case and its progress.

In the clinical management of the puppy or mature dog with severe hookworm infestation, excellent use may be made of intramuscular iron dextran. One may well consider: (1) there is extreme variation in the hemoglobin level; (2) there is also extreme variation in iron need because in the clinical management of the hookworm problem it is possible to raise puppies that always show hookworms, and these puppies will be neither anemic nor iron deficient; (3) the over-dosage of intramuscular iron is undesirable as most iron is not eliminated except through blood loss; (4) there are many possible anemia situations that are not iron-deficient anemias, such as anemia secondary to kidney dysfunction where the excessive use of intramuscular iron dextran may be harmful; (5) we use intramuscular iron dextran in hookworm anemias, employing the following formula: *Subtract the actual hematocrit from the optimum hematocrit; multiply by 10% of body weight in pounds. The result equals ¼ of total dosage in mg. of intramuscular iron dextran.* The dosage may be given on four different days.

Boxer Puppy. Weight: 19 lb. Hematocrit: 23. The optimum Hct. may be said to be 40.

40 optimum Hct.
—23 actual Hct.
17 Hct. differential
x 1.9 10% of body weight
153
17
—32.3 mgs. of iron dextran to be given four times.

Mature Terrier. Weight: 27 pounds. Hematocrit: 39. The optimum Hct. may be said to be 50, although many have a normal Hct. of 55.

50 optimum Hct.
—39 actual Hct.
11 Hct. differential
x 2.7 10% of body weight
77
22
—29.7 mgs. of iron dextran to be given four times.

This formula was suggested by an excellent article,[1] Current Status of Therapy in Anemia, Journal of the American Veterinary Medical Association, June 7, 1958. Thus far we have successfully used about 1,800 cc. of intramuscular iron dextran in dogs. From the formula, the practitioner may find that a five-pound puppy with hookworms receives more intramuscular iron dextran than a 50-pound mature dog with a few hookworms and an excellent hemoglobin level.

2. A blood transfusion usage may occasionally be found in the post-infection phase of any illness or stress situation where there is considerable loss of hemoglobin level or weight, or both. Here again, recorded weights and hemoglobin determinations enable the clinician to anticipate the need for blood transfusion. If the dog needs a transfusion, it usually needs 10 cc. of ACD blood per pound of body weight. However, in large dogs we sometimes give only 5 or 6 cc. of ACD blood per pound of body weight. This procedure may be repeated in 24 or 48 hours, as determined by the judgment of the clinician.

3. A blood transfusion may give the chronic nephritis dog with a low hematocrit some aid. (Fluid electrolyte additives are not needed in situations No. 2 and 3.)

4. A case of shock resulting from tick and flea dip poison was treated at our clinic. A client had dipped five poodles, using warm water and a commercial pine oil-malathion combination. Thinking the parasite problem severe, the client made the solution too strong. Two of the dogs immediately went into shock and coma. The temperature of these two dogs was 95 F. when the animals were presented for examination and treatment. We rinsed the dogs and then washed them and put them on a heating board with hot air from a small hair dryer blowing over them. For therapy we first gave each dog 12 cc. of electrolyte dextrose-additives combination intravenously per pound of body weight. Since there was no apparent improvement, we gave each dog 10 cc. of whole ACD blood per pound of body weight. Remembering Doctor Fine[2] and shock we also immediately gave penicillin-streptomycin. Both dogs received constant attention to keep them warm and turned over often. They could drink water in about 12 hours. Both recovered uneventfully. Three weeks later, one was subjected to a cesarean section and had three healthy puppies. About one-half hour after the operation, the dog began to hemorrhage from the uterus. She weighed 7½ pounds and was given 100 cc. of freshly drawn ACD blood. Recovery was uneventful and she cared for her puppies as well as any dog after a cesarean section.

5. On rare occasions in my practice, there is presented a dog that is one or two weeks from full-term pregnancy. From appearances and examination of the hemoglobin level, it may seem the animal has too many puppies and too little blood. Here a blood infusion is in order.

As an example: Examination of a mixed Beagle deer hound showed a few filaria and hookworms, and a Hct. of 26 or hemoglobin of 8.17 gm. The owner said the animal had had two large litters of puppies previously, but all the puppies died because the milk "was too acid." The dog could hardly walk because of her large abdomen. Her appetite was excellent. No medication was given for the filaria or hookworms. The dog was given three transfusions of 300 cc. ACD blood each over a period of nine days. She whelped eight healthy puppies and now,

1½ years later, seven are still living and all go hunting.

Fourteen months later, the same dog was presented with the same problem. This time the Hct. was again 26 or 8.17 gm. Filaria and light hookworm infection were evident. She was not treated for hookworms until the puppies were three weeks old. This time she was given two bottles of 300 cc. of ACD blood, and 75 mg. of intramuscular iron Dextran four times. She whelped 11 puppies, three of which were born dead. The eight surviving puppies, at the time this is being written, are five months of age and have never been sick. This is probably a case of *physiological anemia* in the dam.

6. Occasionally a young dog in previously excellent condition, but now suspected of beginning a distemper syndrome, has an accelerated ESR, and the hemoglobin is not maintained. A daily hematocrit reveals the lowering of the hemoglobin level to be a definite and sometimes shocking fact. This dog can well use 10 cc. of ACD blood per pound of body weight to help maintain an optimum hemoglobin level. Usually one transfusion is sufficient.

I had one Poodle puppy, previously in excellent health, require three transfusions in one week to maintain the hemoglobin level. The puppy has since been in excellent health. Usually there is concurrent weight loss. (Baby scales may be used to get accurate weights of small puppies and small dogs.)

7. An animal with extreme infestation of ticks or fleas which has a hematocrit of 15 (4.92 gm.) or less usually will not survive the use of any wet or dry insecticide. To survive, such an animal needs blood infusion and then one can carefully use an insecticide. With such management, the mortality rate is zero. The last case we treated seems unbelievable. A four-year-old red 24-pound male Cocker, with a hematocrit of 6 and extreme flea infestation was presented. We wrapped this dog in a blanket to contain most of the fleas, slowly gave the dog two bottles of ACD blood (total of 480 cc. of blood and 60 cc. ACD), then carefully dipped it in pyrethrum-rotenone and warm water, washed it and put it in a dryer. When dry, it was clipped and sent home. At the beginning of therapy, we gave it antibiotics and SoluB (Upjohn); 75 mg. of intramuscular iron was given after the transfusion. The owner was directed to give table sugar, dry skimmed milk, Myeladol and Lytren (Mead-Johnson) eight times daily. The injections were repeated the next day. Incidentally, four hours after the blood infusion, the Hct was 37 (11.42 gm.) and the next day the hematocrit was still 37. One week later the hematocrit was 47 (14.36 gm). The antibiotics, parenteral B vitamins and 75 mg. of intramuscular iron were repeated the second day. Recovery was uneventful.

Surgical Usage of Blood Transfusion

1. If extensive blood loss occurs during surgical procedure, replacement of blood is necessary, and to be of value it needs to be replaced during blood loss.[3] Dosage is approximately equal to the amount of blood lost, plus 10 cc. per pound of body weight of ACD blood if there is likelihood of impending shock.

2. In impending or actual shock, blood transfusion is advisable. In the very young animal, and often in the Toy dog under anesthesia, early use of blood infusion usually overcomes the shock problem immediately. We usually use 10 cc. of ACD blood per pound of body weight.

3. Blood transfusion is proper in any surgical procedure for repair of debilitated or extensively injured animals. This covers most transfusion use in my practice. A total of 10 cc. ACD blood per pound of body weight is usually the dose used.

4. If an animal is to have a cesarean section and has a hematocrit of 30 or less (hgb of 9.35 gm.) we usually transfuse blood during the surgery — dosage: 10 cc. of ACD blood per pound of the normal body weight. Here is an excellent place for the pediatric ACD blood vacuum bottle. In the pre-operative examination of the cesarean subject, if the clotting time of the blood is four or more minutes by open-drop method, and if there is a sluggish uterus, and also if there are a number of puppies, one may encounter uterine hemorrhage. Again, a blood transfusion during surgery is in order.

These precepts of a lowered blood level

during and after surgery are encountered most often in the cesarean section subject such as the Boston with the lowered blood level and three or four puppies. If a Poodle were to be subjected to a cesarean section and had a hematocrit of 50 and one puppy, these precepts would not apply.

A non-pregnant animal in excellent condition with a hematocrit of 50 and zero erythrocyte sedimentation rate, if subjected to anesthesia, surgical trauma and blood loss as from a cesarean section, would not show any change in the hematocrit at the time of the conclusion of the surgery as may the cesarean subject.

There is no relation between blood loss situations in previously healthy animals and the early hematocrit or hemoglobin level of the blood.[2] It is possible to remove 20 cc. per pound of body weight or approximately one-half of the total blood volume from a healthy dog in four hourly divided collections of the blood, and at the end of the four hours find no fall in the hematocrit or hemoglobin level. I do not believe these principles are always true of the animal that is not in excellent condition. Many factors enter into such problems.

The change in a hematocrit from 40 to 34, or the hemoglobin from 12.3 to 10.5 gm. in the cesarean section subject, would probably not be serious. But, the lowering of the hematocrit from 32 to 26 would be quite serious. Here is the place for the anticipated blood transfusion, as stated.

Surgical Shock and Resuscitation in the Dog

Shock during canine surgery may arise any time from many causes. Pyometritis is a condition that is both a common problem and one that lends itself well to an explanation of a number of clinical manifestations. However, these same factors of shock and all phases of resuscitation are equally true of such diverse situations as the surgical heartworm removal problem, the severe trauma problem and the severe snake bite poison accident.

In the over-all aspect of many surgical problems, shock is most important. For instance, in the 12-year-old animal off feed for six days and with endopyometritis, the surgical problem involves shock. This shock situation occurs with or without pre-surgical peritonitis. Bacterial factors are present. Usually bacteria are found in the uterus. (In 30 cases of pyometritis, the exudate of the uterus was cultured and antibiotic sensitivity tests run by a commercial laboratory. Eighty percent were *E. Coli* and also more than 90% of the total cases were most susceptible to penicillin-streptomycin. Pseudomonas was found twice, Beta hemolytic *Staphylococcus aureus* once, and two were sterile.) There is occasionally some peritonitis in endopyometritis. Very importantly, we know from the work of Dr. Jacob Fine that whenever a shock situation arises in the dog there is always a bacteremia.[3] This bacteremia also occurs if there is shock only from anesthesia and no surgery in a normal animal. Also we learn from Doctor Fine that the less barbiturates are used in shock prone situations, the less the shock factors. In Dr. Jacob Fine's monograph, The Bacterial Factors in Traumatic Shock, I have found more than ten positive statements which are scientific truths that seem to apply the same to canine shock associated with snake bite poison, shock associated with the surgery and problem of endopyometritis, the shock factor in the surgical removal of *Difilaria immitis* from the pulmonary artery, the shock that may occur in the Boston Terrier following cesarean section, or shock associated with the surgical repair of a trauma problem.

The earlier one can use antibiotics, the more useful they are. The anesthesia is usually a simple problem in the severe pyometritis inasmuch as these animals are often in sub-clinical shock and they require little anesthesia.

We use Pentothal Sodium (Abbott) for routine oophorectomy rather than Nembutol (Abbott). Hypothetically, if one would spay a vigorous large mature dog with Nembutol anesthesia, the animal would sleep a number of hours and recover with no after-care. However, if one would permit the severe pyometritis animal to sleep many hours post-surgically, the survival chances or percentage factors would be lowered. After surgery, the animal should be ambulatory as quickly as possible.

In the severe pyometritis animal, paradoxical as it may seem, the use of Nembutol with 2% Novocain infiltration in the line of incision is in order. Because the Nembutol requirement is low, this animal often will recover from the Nembutol quicker than it will with Pentothal. However, these precepts are often true in any time-consuming operation. In our hypothetical pyometritis problem, the animal often wakes up quicker with Nembutol than with Pentothal. But for the quickest and most satisfactory recovery and ambulation of the animal, resuscitation calls for keeping the temperature normal and the use of both intravenous fluid electrolytes and blood transfusion. When possible, the blood transfusion, water-dextrose-electrolytes, or both, may be started just as soon as one closes the peritoneum. When not necessary as immediate resucitative procedures, if blood transfusion and fluid electrolytes are given too early during the surgical preoceure, more anesthesia is required and a much longer recovery follows. When blood transfusion and fluid-electrolytes-dextrose are given right after closing the peritoneum, they aid in early recovery of the animal. We then find that an involved surgical procedure requires very little anesthesia, and the recovery time is very short. This animal can walk out the front door the day of the surgery and, very importantly, it can be cared for at home. It can be brought to the hospital for any routine needed, such as antibiotics, for a few days. In my opinion, the old dog always does better in its home surrounding.

The use of 2% Novocain (Winthrop) infiltration in the midline allows for less general anesthesia. We have never noted sensitivity or reaction from using Novocain and intravenous barbiturates in the mature animal. However, in the young animal when Novocain is used with intravenous barbiturate, there is a frequent and very definite reaction or period of apparent lowered blood pressure that is short-lasting when oxygen is made available to the puppy. We have had no fatalities and we have continued the use of Novocain infiltration in puppies. The use of oxygen during involved surgical procedures is to be expected. The time of anesthetic recovery does not depend entirely upon which anesthesia is used, but recovery time and success depend upon the resuscitative procedures described.

In the extreme pyometritis situation, success is 15% operative skill and 85% attention to the many resuscitative procedures. Therefore, in the severely debilitated animal, blood transfusion and fluid electrolyte usage are necessary for quick recovery from any anesthesia. To reiterate, the animal is treated as a shock problem, which necessitates the transfusion of blood, the use of fluid-electrolyte and the early use of antibiotics for best results.

Combined Medical-Surgical Usage of Blood Transfusion

There is an occasional blood transfusion need in a convalescent dog following any procedure or condition which shows loss of body weight, or hemoglobin level or both. If one records a number of such examinations, the blood transfusion need may be anticipated. This occasionally occurs one or two or even three weeks after extensive trauma with surgical repair or surgically corrected problems such as pyometritis. Usually we use 10 cc. of ACD blood per pound of body weight per infusion.

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Food for the Ocelot

I have yet to see a mature pet ocelot that was "a sweet pet." They can, however, be fed the same as other felines. A mixture of dog food with meat is excellent, and if they prefer meat alone, it should be fortified with vitamins and minerals. Liver should be fed once a week.—*L. E. Fisher, D.V.M.*

Feline Orchiectomy Technics

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THE PRESENT STUDY was undertaken to learn which method of feline orchiectomy is most practical.

Cats can be castrated at any age and season of the year, preferably with the use of the emasculator.[1] However, it is advisable to delay castration of tomcats until they are at least six months of age to allow development of organs involved in obstructive calculi.[2]

A total of 39 apparently healthy native male cats, ranging from six to 22 months in age, and from 1.7 to 3.8 kilograms in weight, were used in this study. Euthanasia of two cats was carried out with 5 cc. of saturated solution of magnesium sulfate administered intracardially. Study of the surgical anatomy of the operative area in the fresh state followed. Another cat was bled to death and embalmed with 5% formalin-phenol solution containing a special dye for detailed dissection of the blood vessels of the surgical field. For castration *via* the scrotal incision, a total of 18 animals were used: that is, the ligation method on the left spermatic cord and the surgeon's knot method on the right spermatic cord were used in six cats; the ligation method in the left and torsion on the right in six cats; and the surgeon's knot on the left and torsion on the right in six cats. The same technics of castration were performed on another set of 18 cats for the prescrotal site.

Cats used in this study were given the same preoperative and postoperative care. Surgical instruments and drapes were sterilized. Three minutes prior to the actual operation, each cat was weighed, and temp-

erature, pulse and respiratory rates recorded. Each cat was anesthetized by inhalation with A.C.E. solution which consists of 35 cc. alcohol, 37.5 cc. chloroform, and 135 cc. ether. The hair on the operative area was plucked and the area disinfected with Zephiran Chloride (Winthrop) 1:1000 solution. Disinfected rubber gloves were used during the operation.

For castration at the scrotal site, two incisions parallel to the median raphe on the postero-ventral aspect of the scrotum were made. In using the prescrotal site, based on the technic of castrating dogs,[4] two incisions instead of one were employed 4 mm. anterior to the penis on the inguinal region. Incisions in both the scrotal and prescrotal sites were practically of the same length for each castration technic.

Three modes of castration were used in the scrotal and prescrotal sites, namely ligation, surgeon's knot and torsion. The ligation method of castration consists mainly of exposing the spermatic cord and ligating the spermatic blood vessels with chromic catgut type C no. 00. The testicle is excised with a scalpel.

In the surgeon's knot method, a modified technic[1] was followed. With this technic, the spermatic artery and veins are pressed slightly with the thumb and forefinger to drive the blood toward the body. Then a non-crushing forceps is applied at the highest part of the spermatic vessels just before excising the testicle. After the spermatic vessels and vas deferens are tied with a surgeon's knot, the forceps are removed. The long ends or whiskers of the spermatic cord are clipped with a pair of scissors.

The torsion method involves application of non-crushing forceps at the manens chorda after separating it from the cremaster muscle which is severed with a pair of scissors. Above the non-crushing forceps an artery forceps is applied closely, and gently twisted around without pulling it so that there will be equal pressure exerted from both forceps to sever the manens chorda. These three castration methods, and procedures were repeated in the other testicle

TABLE 1. Scrotal Incision Using Ligation on the Left Spermatic Cord and Surgeon's Knot on the Right Spermatic Cord. Ligation on the Left and Torsion on the Right; and Surgeon's Knot on the Left and Torsion on the Right.

Cat no.	Approx. Age (months)	Weight (kgm.)	Healing (days) Ligation	Surgeon's Knot	Torsion	No. of Complete Turns of Forceps	Complications Ligation	Surgeon's Knot	Torsion
1	10	1.9	5	3	—	—	none	none	—
2	8	2.0	4	3	—	—	"	"	—
3	6	2.0	5	4	—	—	"	"	—
4	8	2.3	5	3	—	—	"	"	—
5	10	2.5	5	5	—	—	"	"	—
6	15	3.2	5	4	—	—	"	"	—
7	10	3.8	4	—	4	30	none	—	none
8	6	2.3	5	—	3	27	"	—	"
9	6	1.7	4	—	3	25	"	—	"
10	10	2.9	5	—	6	30	"	—	"
11	12	3.3	6	—	4	31	"	—	"
12	8	2.7	6	—	4	27	Scirrhous cord*	—	"
13	10	2.0	—	7	7	31	—	none	none
14	15	2.4	—	4	3	29	—	"	"
15	15	2.0	—	3	5	17	—	"	"
16	16	2.6	—	7	6	27	—	"	"
17	22	3.8	—	—**	Died***	37	—	"	Died***
18	12	2.0	—	4	7	18	—	"	none
	Minimum		4	3	3	17			
	Maximum		6	7	7	37			
	Mean		4.92± 0.19	4.27± 0.45	4.73± 0.47	27.42 ± 1.60			

*Scirrhous cord appeared 3 days after the operation, but disappeared after 40 days.
**Castrated by the surgeon's knot method; no data on healing for it died during the operation by the torsion method. The surgeon's knot method was performed on the cat before the torsion method.
***Died during the torsion method; necropsy revealed nothing.
— Not performed.
Figure after ± is standard error.

in both sites of operation.

Cats were kept in individual cages after each operation. Aftercare consisted mainly in cleaning cages, changing bedding daily, and feeding once a day with rice, fish and meat. Castration wounds of the different methods in both the scrotal and prescrotal sites were examined daily with particular attention to the duration of healing and any postoperative complication.

Conclusions

1. The duration of operation in the prescrotal site is comparatively longer than in the scrotal site.

2. The prescrotal incision is accompanied by more hemorrhage than the scrotal incision due to unavoidable cutting of the branches of the caudal superficial epigastric artery and vein.

3. The duration of healing in cats castrated by the surgeon's knot method is considerably shorter than those castrated by the torsion and ligation methods in both the scrotal and prescrotal sites. Scrotal wound heals faster than prescrotal wound and the duration of healing in most old cats is longer than in younger ones.

4. Scirrhous cord was observed in one cat castrated by the ligation method. Another cat died following emasculation by the torsion method due to shock.

5. Of the three methods of castration, the surgeon's knot method in both the scrotal and prescrotal sites is the most practical and satisfactory. Castration via the scrotal site is more practical than in the prescrotal site.

Acknowledgment

This is a portion of an undergraduate thesis presented by the junior author on October 17, 1958, to the faculty of the College of Veterinary Medicine, University of the Philippines, in partial fulfillment of the requirements for the degree of doctor of veterinary medicine. This work was conducted under the direction of the senior author.

The authors gratefully acknowledge the encouragement of Dr. L. M. Yutuc, professor and head, Department of Veterinary Medicine and Surgery, and dean of the college, and the suggestions of Dr. J. A.

TABLE 2. Prescrotal Incision Using Ligation on the Left Spermatic Cord and Surgeon's Knot on the Right Spermatic Cord; Ligation on the Left and Torsion on the Right; And Surgeon's Knot on the Left and Torsion on the Right.

Cat no.	Approx. Age (months)	Weight (kgm.)	Healing (days) Ligation	Surgeon's Knot	Torsion	No. of Complete Turns of Forceps	Complications Ligation	Surgeon's Knot	Torsion
19	14	2.6	7	7	—	—	none	none	none
20	18	2.7	8	9	—	—	"	"	—
21	12	3.2	7	7	—	—	"	"	—
22	12	2.4	6	6	—	—	"	"	—
23	20	2.5	10	9	—	—	"	"	—
24	14	3.6	7	6	—	—	"	"	—
25	12	3.3	7	—	7	17	none	—	none
26	16	3.7	11	—	11	30	"	—	"
27	8	3.1	8	—	6	17	"	—	"
28	8	2.7	6	—	7	35	"	—	"
29	6	2.3	6	—	5	17	"	—	"
30	14	2.8	6	—	5	24	"	—	"
31	6	2.4	—	5	7	17	—	none	"
32	6	2.0	—	6	7	20	—	"	"
33	10	2.7	—	7	8	26	—	"	"
34	18	3.4	—	7	7	26	—	"	"
35	15	3.3	—	7	8	18	—	"	"
36	20	3.2	—	8	9	17	—	"	"
	Minimum		6	5	5	17			
	Maximum		11	9	11	35			
	Mean		7.42± 0.47	7.00± 0.35	7.25± 0.48	22.00 ± 1.77			

— Not performed.
Figure after ± is standard error.

Solis, associate professor and head, Department of Veterinary Anatomy, from the same college.

Doctor Aranez is assistant professor of Veterinary Medicine and Surgery, Department of Veterinary Medicine and Surgery, College of Veterinary Medicine, University of the Philippines, Quezon City; Doctor Cruz is a recent graduate from the same college.

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Feeding Snakes

Many non-poisonous snakes make interesting pets. We do not keep or recommend poisonous snakes. Water must be provided at all times both for the snake to drink and also for bathing, and should be changed daily. A temperature of 70 F. should be maintained. Should the snake develop fungus, a smaller water dish, just large enough to drink from, should be substituted. Most species of snakes require live food, and inanition is a major problem in keeping snakes both as pets and in the zoo collection. Snakes should be fed about once a week; dead mice, birds, meat, and other substances can be tried. When feeding chopped fish — twice weekly feedings are recommended, and the slug and earthworm feeders require even more frequent feeding. All sharp bones must be removed when feeding chopped fish.

The non-venomous snakes fall into two catagories on the basis of their manner in seizing prey: constrictors and non-constrictors. The constrictors live chiefly on warm-blooded animals — birds and mammals; the non-constrictors live chiefly on cold-blooded animals — frogs, fish, lizards, snakes, etc. Snakes can be cannabalistic, therefore care should be taken in placing species together. Vitamins can be added to the food when possible since snakes swallow their prey. Snakes can be force fed if necessary, but this is not always successful and requires practice.—*L. E. Fisher, D.V.M.*

Infectious Canine Hepatitis

Infectious canine hepatitis is an acute viral disease of dogs that varies from an inapparent to a severe infection. In clinical cases, important signs of illness are temperature elevation, leucopenia, prolonged bleeding time, hemorrhages and edema, nervous manifestations occasionally, and transient corneal opacity during convalescence. Morbidity is high whereas the mortality is low.

At necropsy, blood-tinged fluid is found in the abdominal cavity and petechial hemorrhages may be present in many tissues. Other important pathological lesions are observed in liver, gall bladder and kidney. Microscopically, intranuclear inclusion bodies are found in liver and endothelial cells.

During illness the virus is discharged in all excretions and direct contact is essential for successful transfer of virus. After recovery, virus is eliminated in the urine and this accounts for maintenance of virus in nature.

It is generally conceded that the immunity resulting from an active infection is solid and long-lasting in most dogs. Simultaneous inoculation with specific antiserum and virulent dog virus produces a solid immunity, but the carrier status is not eliminated. Virus grown in pig kidney tissue-cultured cells does not produce signs of illness and the dogs are immunized.—*J. H. Gillespie, V.M.D.*

FIGURE 1.

Technic of HOMOTRANSPLANTATION *of Skin in Mice and Rats: The Michel Clip Method*

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BECAUSE of the consistent interest in the immunological aspects of homotransplantation, there have been numerous articles on the methods and technics employed in homografting.[1] In the past, these have been developed to suit the individual needs of each research project.

One of the basic methods for studying a variety of problems concerned with growth, vascular development, and circulatory physiology of normal and neoplastic tissues is Algire's chamber technic. This involves use of a transparent chamber on mice in order to study the early growth of melanomas.[2] This method has spawned many variations[3,4] which have been a great help in sudying the revascularization of homografts in rodents.

To secure the graft to the host site, many technics have been used. Woodruff and Simpson[5] sutured their grafts to the recipient, and then used a fine-meshed tulle gras and plaster of Paris dressing, as suggested by Billingham.[6,7] Ishikawa originally used silk suturing material, polyvinyl film covering, and an adhesive bandage with cotton padding. Later, however, he found it more advantageous to use no suturing or dressing.[8] In one group of animals, Ashley placed an aluminum foil approximately 3 cm. sq. over the graft, and then taped the dressing to the animal.[9] Using another variation, Woodruff[10] placed a sheet of Millipore filter between the graft and the recipient bed. He noted that homografts over Millipore are not effectively antigenic. With regard to the depth of skin graft, Ballantyne and Converse,[11] in experiments on 157 rats, reported that there was no appreciable difference in survival time between a suprapan-

nicular (not including panniculus carnosus) and a subpannicular homograft (including panniculus carnosus).

At present, it is agreed by most workers that a skin graft will "take" if it is held securely in place with slight perpendicular pressure upon an aseptic and vascular bed until healing of the opposed tissues is achieved. Removal of all subcutaneous homograft tissue, however, must be complete.

Methods

Grafts presently employed are approximately 2.5 cm. sq. and are derived by the following dissection technic. First, the rats are shaved with a small clippers. Using a forceps, the skin in the post-medial region of the dorsum is elevated, and a transverse incision (approximately 1.25 cm.) is made with a dissecting scissors. Next, scissors are inserted into the incision, skin is freed from panniculus carnosus, and the desired size and shape of the graft needed is dissected out (fig. 1). The graft is then spread out on a flat surface (*e.g.*, a piece of cork), and subcutaneous tissue is removed with scissors or other suitable instrument (fig. 2). After removing the fat from the dermis, the graft is secured to the recipient site (a square defect in the dorsum of the host) by means of 1 mm. Michel clips in such a manner that hair in the graft will run in a reverse direction to that of the host (figs. 3 and 4).

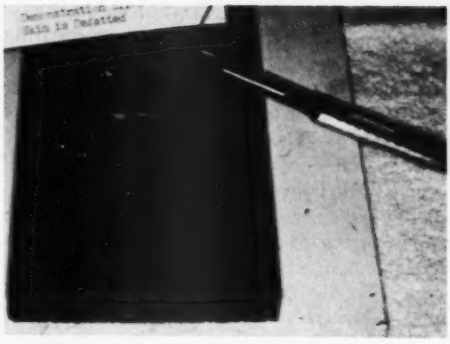

FIGURE 2.

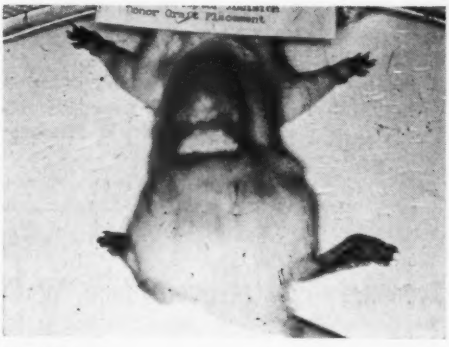

FIGURE 3.

FIGURE 4.

Results and Discussion

This technic of homografting has been applied successfully on 1,000 animals without a single case of infection.[12] No type of perpendicular pressure seems necessary to achieve successful results. Animals themselves seemingly help facilitate the healing process by licking one another's grafts. In one series of animals, the litters were divided equally; on one-half of the animals, aluminum foil was placed over the graft; on the other half, the graft was secured by Michel clips, but left open. Animals with Michel clips exhibited onset of slough eight days after grafting. However, among the animals with aluminum foil dressing, grafts

were still soft and visible when foil was removed on the ninth day. Onset of slough began between ten and fourteen days following grafting. This variation in onset was obviously of an artificial nature, indicating that the bandaging method delays natural onset of slough. As a consequence, considerable deviations in tabulating control data may result.

In conclusion, the advantages of using the Michel clip are: (1) immediate observation of the graft condition; (2) in comparison to the suturing and bandaging technics, it is more expedient and less time consuming, and (3) the animals seem healthier and more active.

Summary

A technic is described in which Michel clips were used to secure homografts to rats. One thousand animals were successfully homografted by this technic.

This work was performed under contract with the Division of Medical Research and Development, United States Army, Contract No. DA-49-007-MD-646.

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Pyometra and Pseudopregnancy of the Bitch

Symptoms of pseudopregnancy become more and more exaggerated with increase in age of the bitch and it is not unusual to find pyometra resulting. The etiology is not completely understood, although degeneration of the corpus luteum and endometrial glands is frequently found.

Any illness of the non-spayed female over two or three years of age should be regarded as a possible pyometra unless proved otherwise. In a typical case, a bitch remains in heat 60 or 70 days prior to the illness; the abdomen is relaxed, slightly distended and sagging; breasts are enlarged and edematous; the vulva is elongated and doughy to the touch; and, if a discharge is present, it may vary from mucoid to milky or hemorrhagic in character. Usually the cervix is contracted, sealing the os and preventing escape of fluids. All mucous membranes are pale though the sclera may be hyperemic. Anorexia may be partial or complete. However, the bitch remains thirsty and often excessively so.

Laboratory examinations indicate an increased sedimentation rate: anemia with reduction of hemoglobin to 9 gm., a red cell count to about three million and a leukocytosis of from 18,000 to 110,000 per cc.

Ovario-hysterectomy is indicated. When performed carefully, ligating all large vessels, and with proper postoperative care, prognosis is favorable. Whole blood or plasma and saline-glucose solutions are indicated both before and after surgery. The cystic degeneration of utero-ovarian tissues indicates irreparable damage so that surgical removal is entirely justified. — *Vet. Science News.*

Here each month are published ideas, suggestions and comments picked up by VM reporters.

Small Animal Clinic

General Anesthesia in Dogs

ASPIOTIS *et al.* of the Veterinary College of the University of Salonika, Greece, writing in the *Cornell Veterinarian* for April 1959, report informatively on General Anesthesia in Dogs by Pentobarbital Sodium. One of their observations is that deep surgical anesthesia is satisfactorily measured by the disappearance of the "pedal reflex," which means that there no longer is a response by the animal when the tips of the toes of a hind limb are subjected to strong digital compression. Another point is that the "corneal reflex" reappears about one hour before the "pedal reflex" is again established.—*R. R. Dykstra, D.V.M.*

Glycosuria in Lead Poisoning

ROXBURGH AND HAAS report three cases in which glycosuria with a normal blood sugar level led to the correct diagnosis of lead poisoning. The sources of the lead included paint chewed off window sills, and colored crayons (yellow and orange).

The glycosuria probably results from renal tubular damage, inasmuch as it occurs with normal blood sugars. Added evidence comes from the aminoaciduria seen in lead poisoning, suggesting that proximal tubular reabsorption of both glucose and amino acids is impaired by lead and certain other metals. Mercury, copper and iron have been implicated.

The phenomenon of glycosuria in lead poisoning is apparently limited to children, and serves as a valuable diagnostic clue when present. Prolonged treatment with calcium disodium versenate is associated with depletion of lead from the body, and return of kidney function to normal.—*Arch. Dis. Childhood, 34:70, 1959.*

Gadget Night

GADGET NIGHT at the Kansas City Veterinary Medical Association yielded an interesting assortment of devices each member had discovered to help in small animal practice.

For the occasional small animal client who desires cremation of a deceased pet and wishes to retain ashes, several types of bronze boxes were exhibited that are available to veterinarians. It was pointed out that this is not a type of service veterinarians should promote, but a greatly ap-

preciated service when requested. These containers were manufactured by the Oregon Brass Works, 1127 S. E. 10th Ave., Portland, Oregon.

Reconstruction

DR. FRANCIS A. MARZONI, Medical College of Alabama, reported to the American Association of Plastic Surgeons, in Boston, May 15, that silicone rubber has shown promising results in animal tests and human trials as a soft tissue substitute. The impervious or closed-cell rubber, a spongy material, produced strikingly less tissue reaction and edema than other synthetic materials employed. In dogs, only minimal tissue reaction resulted, and wounds healed uneventfully with no infection, extrusion or gross fluid accumulation.—*GP, July 1959.*

Tumorous Growths in Pet Birds

GROWTHS encountered in pet bird practice may be classified as intra-abdominal and extra-abdominal. The intra-abdominal type are recognized by distention and displacement of abdominal contents, flicking of tail when breathing, debilitation, anorexia, irregular consistency of evacuations, malaises. These growths usually are a cystic mass involving the ovary or malignancies involving the kidney. Histological sections usually reveal an adenocarcinoma or mesothelioma. Euthanasia is the only practical course of action.

Extra-abdominal growths can be classified as lipomas, recognized as a bilateral mass usually found on the breast, adenocarcinomas and xanthomas, usually unilateral on the breast but may be any place, or squamous cell carcinomas and fibrosarcomas usually found dorsal on the tailhead. Recurrence occurs occasionally in the lipoma, adenocarcinoma and xanthoma and the squamous cell carcinoma and fibrosarcoma usually recur.

In surgical management of these growths anesthesia is calculated by weighing the bird in grams. In the case of a debilitated bird, the body weight is multiplied by a factor of .002. In the case of a good surgical risk, the factor is .0025. For example a 40 gm. bird multiplied by .002 equals .08 cc. of anesthetic.

Anesthetic (Sedax—Detroit Veterinary Supply) contains chloral hydrate, sodium pentobarbital, magnesium sulfate in alcohol and propylene glycol. It is injected 3/16 in. into the breast muscle with a tuberculin syringe and a 25 gauge needle.

Two or three minutes after anesthesia the patient is prepared for surgery by removing feathers from the surgical site and washing the area with quaternary ammonium solution. The skin over the least vascular and most prominent portion of the tumor is grasped with the forceps and incised with the scalpel. The incision is extended with the scissors. Hemorrhage is controlled with the mosquito forceps and the mass dissected away with the Bard-Parker handle. Excess skin is cut away with scissors and ophthalmic ointment instilled. Wound closure is made with interrupted sutures and a collar applied. The patient is sent home or confined to the cage and returned in one week.

For removal of warts the base of the growth is infiltrated with Benadryl and 30 seconds later the base snipped off with scissors. The area is cauterized with a silver nitrate stick.—*Dr. R. M. Stone, Michigan State University Conference for Veterinarians.*

Helpful Hints

DR. ROBERT KNOWLES of Miami, Florida reports in *The Georgia Veterinarian* that 12 cc. of acetic acid in a pint of water will kill the smell of cat urine. Also, a small dose of diethylstilbestrol will deodorize a male cat for ten days.

He has also found that a toilet tissue dispenser near the sink and examination table will save money and do a better job of cleaning thermometers, slides and glasses than large paper toweling or cotton. Toilet tissue purchased by the carton costs about 1 cent for 80 sheets.

TECHNIC for CONCHAL HEMATOMA

Fig. 1. Dr. Frank R. Booth, Elkhart, Indiana, demonstrates a simple technic for management of conchal hematoma to a TV audience at the recent A.A.H.A. meeting in Colorado Springs. Here a hypodermic needle is inserted along the anterior margin of the ear.

Fig. 2. A syringe is attached to aspirate accumulated fluid.

Fig. 3. To avoid repeated accumulation of fluid, two pieces of sponge rubber are fashioned to ear dimensions and taped to medial and lateral aspects of ear.

Fig. 4. Uniform pressure is achieved with minimal risk of permanent tissue damage.

Fig. 5. The bandaged ear as shown in figure 4 may be positioned over the dog's head if desired.

Treating Hookworms

OBSERVATIONS on the administration of toluene as a vermifuge to over 400 dogs were reported at the Second Annual Florida Conference For Veterinarians, May 2-3, by Dr. G. F. Yopp and P. S. Roy. The technic as reviewed in the July issue of *Florida Veterinarian* consists of incorporating 3,024 ml. Toluene and 976 ml. of corn oil. Dogs and cats are administered the drug on the same weight basis:

Capsule Size (oz.)	Weight of Animal
000	5-10 lb.
1/8	10-20 lb.
1/4	20-30 lb.
1/2	30-40 lb.

This dose is administered to each animal daily for five days. The treatment has been administered for as long as 14 days with no apparent ill effects. In case animals are infected with ascarids and whipworms in conjunction with heavy hookworm infection, the five-day treatment only slightly reduces the hookworm infection. In case such animals were first treated with other drugs for ascarids and whipworms, the five-day treatment for hookworms was very efficient. Animals have remained negative to hookworm for as long as eight months after treatment.

Controlling Intestinal Flora

BASED ON A REVIEW OF THE LITERATURE, Dr. Arthur H. Bryan, Jacksonville University, Jacksonville, Florida, suggests that cultures of *Lactobacillus acidophilus* and *bulgancus* should merit further investigation in combating undesirable microbial intestinal flora in small animals.

Doctor Bryan's review indicates that ingestion of the living cultures, especially acidophilus, results in relief from canine and feline chronic constipation, diarrhea and colitis, and is particularly valuable in infant diarrheas. In dogs and cats, feces tend to become pale yellow to almost white, semi-soft and odorless. Gas pains particularly in dogs five to eight years of age are far less frequent when cultures are ingested daily.

Hyperchlorhydria appears to be reduced by cultured milk therapy in human beings and possibly might work in small animals. *L. acidophilus-bulgaricus* therapy is reported to have given clinical promise in clearing up certain types of allergic dermatitis in dogs and cats. The physiological and enzymatic action of these organisms in carbohydrate metabolism may bear on these findings. Acidophilus splits protein particles in the mouth to oral lactic acid which could cause some tooth decay over a long period.

It has been noted that such culture therapy is only effective when ingested regularly. If therapy is discontinued, the normal flora of putrefactives gradually dominate the picture and symptoms recur.

Buttermilk and yeast have long been recommended in gastrointestinal disorders. The two organisms, *acidophilus* and *bulgaricus*, were isolated from Bulgarian milk food products.

Doctor Bryan points out that pure cultures of these organisms can be obtained from the Dairy Division of the USDA, Washington D. C. Veterinarians could easily culture both by mixing them with any sterile, liquid milk at regular intervals. In this manner cultures can be kept going indefinitely. The technic consists of transferring a few cc. of culture to sterile milk media and incubating at room temperature for 24 hours and dispensed cool, or flavored with some fruit extracts if desired.

For those interested in the subject the following references are suggested.

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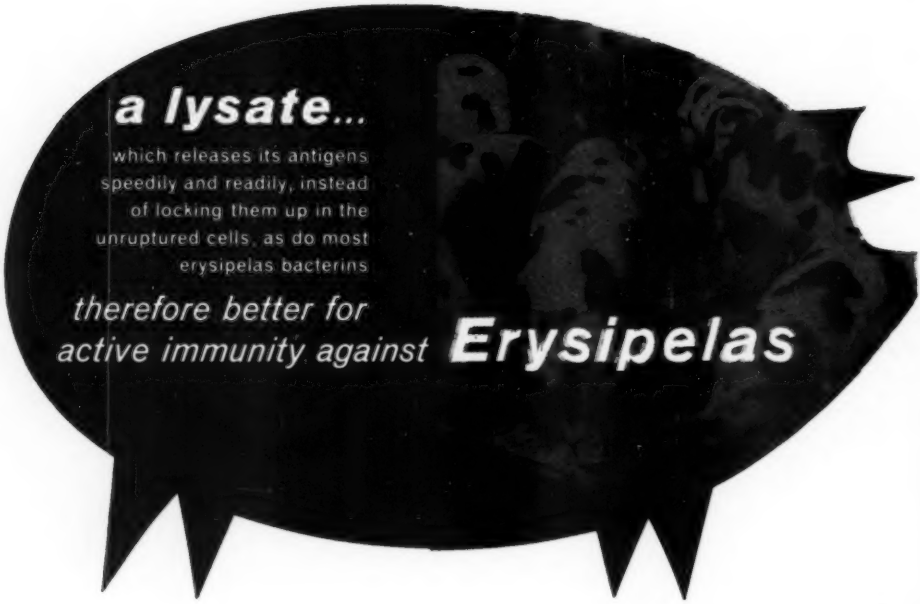
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Controlled studies reported here indicate that coccidiosis can be controlled by mass medication in the drinking water supply with a soluble form of nitrofuran. A lack of complete immunity was demonstrated on challenge.

Experimentally Induced Ovine Coccidiosis

II. USE of WATER SOLUBLE NITROFURAZONE AS a THERAPEUTIC

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THE MODE OF THERAPEUSIS is extremely important in treating any disease. While treatment of the individual animal is probably more efficient in regard to the certainty of adequate dosage, it is often so cumbersome and time consuming that it becomes economically unfeasible. Thus the present methods for the incorporation of coccidiostats in feed and for the therapeutic treatment of coccidiosis in the feed or water. Experimental infections with *Eimeria ninaekohl yakimovae* and *E. faurei* in lambs revealed that infected animals consumed as little as 62% of their normal feed consumption per pound of body weight while the amount of water intake per pound of body weight did not fluctuate significantly.[1] With the development of a "water soluble" nitrofuran (soluble Furacin—Eaton*), and with the knowledge that nitrofurazone was effective against ovine coccidia,[2,3,4] the following experiment was conducted.

*Supplied by Eaton Labs, Norwich, New York, as Furacin Water Mix Veterinary, containing 4.59% Furacin (brand of Nitrofurazone).

Materials and Methods

Nineteen wether and 19 ewe lambs were obtained from a southwestern North Dakota flock. The lambs were checked for coccidia by means of a fecal flotation method and were all found to be negative for oocysts. They were alloted on the basis of sex and weight to five treatment groups. Each treatment group except one consisted of two replicate lots of two wethers and two ewes each. The excepted group had two replicate lots of two wethers and one ewe each. All lambs were drenched with a therapeutic dose of phenothiazine four days previous to the initiation of the experiment. All lots were fed a pelleted feed containing 49% ground alfalfa hay, 40% ground yel-

low corn, 10% molasses, and 1% trace mineralized salt. To this was added four pounds of phenothiazine per ton.

The lambs were housed on concrete slabs, half of each pen was covered, the other was open. Pens were so constructed that the fecal material from one pen could not contaminate another pen. All pens were cleaned twice daily. Treatment groups were designated as follows:

Lots 1a and 1b — Uninfected, unmedicated.

Lots 2a and 2b — Infected, unmedicated.

Lots 3a and 3b — Infected, .008% Furacin in water.

Lots 4a and 4b — Infected, .01% Furacin in water.

Lots 5a and 5 b — Infected, .0133% Furacin in water.

Lots 2a and 2b had three lambs each, all other lots had four.

All lambs to be infected were given approximately the following number of sporulated oocysts by drench:

Eimeria arloingi	4,290,000
E. ninae-kohl yakimovae	4,000,000
E. intricata	565,000
E. parva	490,000
E. faurei	350,000
E. pallida	183,000

As soon as symptoms of coccidiosis appeared, lambs in that lot were given the medication previously designated for a period of seven days. During this time water consumption was recorded in order to ascertain the amount of the drug consumed. Feed consumption was recorded throughout the experiment; lamb weights were recorded weekly.

Thirty-four days following initial infection, all surviving lambs in all treatment groups were challenged with approximately five times the number of oocysts administered in the initial infection. Oocyst counts were not made; however, periodical fecal examinations were performed to discern the species being passed. The experiment was concluded 67 days following initial infection.

Results and Discussion

Signs of coccidiosis, including scouring and anorexia, appeared in all infected lots on the 11th day following administration of the oocysts. At this time previously determined quantities of Furacin were placed in the water of treatment groups 3, 4, and 5. On the fourth day of treatment (15 days following infection) one lamb in each replicate of the infected-unmedicated group (lots 2a and 2b) was passing large quantities of bloody diarrhetic feces. Both died of coccidiosis on the fifth day of medication. All lambs that were infected scoured profusely. Blood was noted in the fecal ma-

TABLE 1. Average Weight Change and Feed Consumption Per Lamb (In Pounds)

Lots and Treatments*	Previous to Challenge (34 Days)		Following Challenge (33 Days)		Total (67 Days)	
	Wt. Change	Feed Cons.	Wt. Change	Feed Cons.	Wt. Change	Feed Cons.
Uninfected—unmedicated						
1a	10.0	84.5	4.7	59.5	14.7	144.0
1b	6.2	85.8	5.5	60.2	11.7	146.0
Infected—unmedicated						
2a	—21.3	72.7	6.5	65.5	—14.8	138.2
2b	—18.0	78.0	10.0	65.0	— 8.0	143.0
Infected—.008% Furacin						
3a	7.2	89.5	7.5	78.7	14.7	168.2
3b	5.5	81.5	9.2	78.7	14.7	160.2
Infected—.01% Furacin						
4a	2.0	76.2	10.5	70.0	8.5	146.2
4b	6.2	89.5	9.2	71.2	15.4	160.7
Infected—.0133% Furacin						
5a	6.0	101.7	7.3	67.5	13.3	169.2
5b	9.5	86.7	11.0	81.2	20.5	167.9

*All medicated groups received Furacin in the water for seven days following the onset of signs of coccidiosis.

TABLE 2. Total Furacin Consumed Per Lamb During Seven Day Treatment Period

Lot and Treatment	Grams Consumed Per Lamb
Infected—.008%	
3a	1.475
3b	0.878
Infected—.01%	
4a	1.304
4b	1.799
Infected—.0133%	
5a	2.989
5b	2.518

terial in all infected groups.

Fecal examinations on the 15th day following infection revealed oocysts of *Eimeria arloingi, E. ninae-kohl yakimovae, E. faurei,* and *E. parva* in all infected groups. On the 22nd day these species as well as *E. intricata* and *E. pallida* were being passed in all infected groups although few *E. faurei* oocysts were observed.

Challenge infections produced no deaths, even in the previously uninfected, untreated group. Oocysts of all species given were found in all groups on the 20th day following challenge.

Average feed consumption and weight gain, before and following challenge, are presented in table 1.

All infected-medicated lots gained more weight than the infected-nonmedicated lots. Lot 5b (0.0133% Furacin in water) more nearly approached the weight gains of the uninfected-nonmedicated group (1a and 1b) during the period previous to challenge infection. All infected-medicated lots gained more than lots of the infected-nonmedicated group for the entire 67 days.

Previously uninfected-nonmedicated lambs of lots 1a and 1b gained little weight following challenge. The lack of oocysts in the fecal material of each of these lambs at 15, 21, 28, and 33 days following administration of sporulated oocysts to lambs in the other lots indicated that management procedures were successful in preventing contamination from other pens.

One lamb in lot 5a died on the fourth day following challenge infection as the result of a perforated pharynx that occurred during the administration of the challenge dose.

The total amount of active Furacin consumed per lamb in the seven day medication period is presented in table 2. These data were calculated from the water consumptions during this time.

Summary

Lambs experimentally infected with a total of 10,000,000 sporulated oocysts of *E. ninae-kohl yakimovae, E. arloingi, E. intricata, E. parva, E. faurei,* and *E. pallida* scoured profusely and exhibited blood in the feces. Treatment for seven days following the onset of clinical signs with .008%, .01%, and .0133% "soluble" Furacin in the drinking water of these lambs successfully prevented mortality and reduced morbidity. Infected-medicated lambs gained more weight than the infected-nonmedicated lambs. Upon challenge infection with ten times the number of oocysts used originally all lambs scoured, those previously not infected scoured profusely and lost weight. Oocysts of all species used on challenge were found in every group of lambs on the 20th day following challenge, thus indicating a lack of complete immunity in all groups to any of the species.

Acknowledgment

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Leptospira Antibody Production by Bovine Fetuses

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IT IS COMMONLY STATED that calves are born without gamma globulin and that the bovine fetus is unable to produce antibodies. The first part of the statement is invalidated by the detection of measurable amounts of gamma globulin in precolostral serum of newborn calves.[1] The question whether this globulin has been developed by the calf or passively acquired *in utero* was left open by Pierce.[3] Little and Oreutt[4] found Brucella agglutinins in precolostral serum of a premature Brucella-infected calf and in serum of aborted fetuses from Brucella-infected cattle, but expressed no opinion about the origin of these antibodies.

The ability of the bovine fetus to develop immunologically active gamma globulin is indicated by the following observation.

A cotton filtered guinea pig liver suspension (5 ml.) containing approximately 2×10^3 guinea pig infective doses of Leptospira saxkoebing per ml., was injected into a placentome in each of two laparotomized cows on the 214th day and 223rd day of pregnancy. In order to prevent maternal leptospirosis, the dams had been passively immunized against the infecting strain by the intravenous injection of bovine immune serum 24 hours before the inoculation.

The dams were only slightly affected by the operation. The first cow gave birth to a calf on the 261st day of pregnancy (that is, 47 days after inoculation). The membranes were expelled in both cases within eight hours after birth; the cotyledons appeared normal except for three uniformly necrotic cotyledons in the membranes of the calf.

The three calves were smaller and less vigorous than normal calves, but developed normally until killed when nine and seven days old. Necropsy showed no gross lesions, but histological examination revealed small interstitial cell infiltrations in the renal cortex and in the periportal tissue of all three calves. Infiltrating cells were predominantly histiocytes, with some eosinophilic leukocytes and cells resembling lymphocytes. These findings could be explained as results of a fetal leptospirosis. However, leptospires could not be demonstrated in the kidneys by impregnation *ad modum* Levaditi or by cultivation in Korthof's medium.

As the titers of precolostral sera from the calves greatly exceeded those of the dams at any time during the experimental period, it is highly improbable that the antibodies found in the unfed calves were transferred from the dams. Moreover, the steadily rising titers of the calves suggest that already at birth the calves were in a state of antibody production.

Electrophoresis on paper disclosed the presence of small amounts of gamma-globulin in all three precolostral calf sera. Agglutinin-lysis titration of eluates of the various protein fractions showed the antibody activity to be associated mainly with the gamma-globulin fraction.

It is concluded that the three calves examined had developed immunologically active gamma-globulin *in utero* in response to fetal infection with *Leptospira saxkoebing* —*Nature*, 180:1210, 1957.

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The Effect of Temperature on Ram Spermatozoa

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IT IS GENERALLY BELIEVED that fertility of sheep is very low during prolonged periods of hot weather, such as normally occur in the southeast during the summer months. This decrease in fertility is attributed partly to failure of ewes to have a normal estrus cycle and partly to a decrease in fertility of ram semen.

Lowered fertility of Hampshire rams exposed to high temperature was reported by Phillips and McKenzie.[1] McKenzie and Berliner[2] reported an increase in spermatogenic activity from October to January for Shropshire and a similar increase for Hampshire rams from August to January. A distinct decrease was found from June to September for the Shropshires, and in July only for the Hampshires. They found that all rams showed increased numbers of abnormal sperm during the hot season. Individual and breed differences in ability to withstand high temperatures were apparent.

Evidence that increasing temperatures lower the quality of semen produced by Shropshire rams was presented by Green.[3] He found a slight but steady increase in head abnormalities, tailess heads and minute sperm cells from January to May with the largest number occurring during June and July. Sperm concentration also began to decline in May, reaching its lowest level in August. A rapid readjustment toward higher quality was noted from July to October.

Dutt and Bush[4] found that low environmental temperature (45 to 48 F.) was effective in improving fertility as measured by motility, sperm concentration, volume, and percent abnormal cells of Southdown rams during summer months. They also reported that ewes kept under low temperatures (45 to 48 F.) required 1.9 services per conception when bred by rams maintained under similar temperatures, and 5.3 services per conception when bred by rams under normal summer conditions (average maximum temperature, 88.7 F). Dutt and

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Contribution No. 306 of the South Carolina Agricultural Experiment Station.

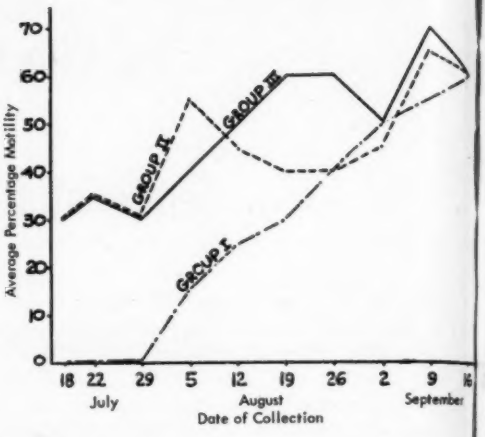
Supported in part by funds from the regional project S-29 entitled, "Improving the Production of Early Milk Fat Lambs," a cooperative study by agricultural experiment stations in the southern region and the U.S.D.A.

Simpson[6] reported significantly higher motility ratings, for sperm cells from Southdown rams kept in an air-conditioned room (45 to 48 F.) from August 20 to September 24, than from rams kept under uncontrolled environmental conditions. Semen from the treated rams contained significantly fewer morphologically abnormal cells than semen from untreated rams.

There is apparently a difference in spermatogenic activity among breeds. Some breeds have the ability to produce fertile semen when subjected to normal summer temperatures. Others lack this ability, yet respond favorably, in some cases, to low environmental temperatures. For this reason, it is essential that the effects of temperature on ram semen be investigated in order to determine the periods of highest fertility.

This study was initiated to compare the effects of normal temperature during the summer months with low environmental temperatures on the motility, volume, and sperm concentration of ram spermatozoa.

CHART 1.



Legend: Group 1—70 F. 16 July-19 August; 60 F. 19 August-16 September. Group 2—Normal temperature 16 July-19 August; 60 F. 19 August-16 September. Group 3—Normal temperature.

Experimental Procedure

Six purebred Suffolk rams were randomly assigned to three groups of two rams each. Group 1 was placed in an air-conditioned room on July 16, 1957, with the temperature controlled at 58 to 72 F. During phase 1 (July 16 to August 15) group 2 remained outside under normal temperatures. During phase 2 (August 16 to September 19) this group was placed in the air-conditioned room with group 1. The temperature was lowered from 68 to 72 F. to an average of 58 to 62 F. over a five day period beginning after collection on August 19. Group 3 remained outside under normal temperatures throughout the entire test. The average maximum outside temperature from July 1 through September 19 was 91 F.

Semen was collected from all rams on July 18 and 22, and thereafter at seven day intervals. The collections were made by allowing each ram to mount a restrained ewe and serve an artificial vagina. Volume, sperm cell concentration, and motility were used as an estimate of fertility. The volume of each ejaculation was determined to the nearest 0.1 cc. Sperm concentration was estimated by the viscosity of the ejaculation and rated as excellent (4), good (3), fair (2), or poor (1). The semen was then extended 1 to 100 in an egg yolk-sodium citrate extender containing two antibiotics, streptomycin sulfate and potassium penicillin G. Immediately after the semen was extended, a sample of each collection was placed on a glass slide, warmed to 102 F. and studied microscopically at 300 to determine the initial motility. The motility was rated at 10% class intervals for percent live cells, and the spermatozoa given a rating of one to five for progressive movement.

Results

Group 1, composed of rams no. 3 and 5, had motility ratings (percent live cells) of zero for the first three collections. The motility of sperm cells from ram no. 3 increased rapidly, reaching 60% on the seventh collection (August 26). Semen from ram no. 5 had a slower increase, which started on the fifth collection and reached 60% motility on the last collection date.

Rams no. 6 and 7, composing group 2, had motility ratings of 60% and zero, re-

spectively, on the initial collection. Ram no. 6 produced high quality semen throughout the test. There was extreme variation in the motility ratings of semen produced by ram no. 7, with the last two collections having very high ratings.

Ram no. 1, in group 3, had low motility ratings for the first three collections, then increased to 60% on the fourth collection and maintained high motility ratings throughout the remainder of the test. Ram no. 4 of this group had high initial ratings, but declined sharply for two collections, reaching a low of 20%. The motility ratings then increased to 60% on the sixth collection, and maintained the same ratings as ram no. 1 for the remaining periods of the test.

It is quite evident that individual ram differences within groups were large. When the average of the two rams in each group is plotted (figure 1), the motility of sperm cells in group 1 shows a steady increase after the first three collections. Groups 2 and 3 had higher initial motility averages than did group 1 and in general maintained higher ratings throughout the experiment.

Table 1 shows the average motility, progressive movement, volume and concentration of the ram spermatozoa of the three groups during the two phases of the test. After transforming the percentage figures into angles, in order to obtain a normal distribution, all data were subjected to analysis of variance as described by Snedecor[8].

Group 1 was significantly ($P < .01$) below groups 2 and 3 in motility and progressive movement during the first phase; however, this difference was not apparent in the second phase. No significant differences in volume were found in either phase. During phase 1, group 3 had a significantly higher concentration rating than did groups 1 and 2. During phase 2, the concentrations of groups 1 and 3 were significantly higher than that of group 2 but they did not differ from each other.

TABLE 1. Average Motility, Progressive Movement, Volume, and Concentration of Ram Spermatozoa, by Groups

Group No.	Phase	Motility %	Progressive Movement*	Volume cc.	Concentration**
1	1	8	1.0	.57	2.1
	2	47	4.1	.50	4.0
2	1	39	3.0	.55	2.4
	2	50	4.8	.48	3.3
3	1	37	3.3	.54	3.8
	2	60	4.2	.57	4.0

*Rated from 1 to 5, with 5 being superior.
**Excellent, 4; Good, 3; Fair, 2; Poor, 1.

Summary

Six purebred Suffolk rams were randomly assigned to three groups of two rams each. Group 1 was placed in an air-conditioned room with the temperature controlled at approximately 70 F. Group 2 was on pasture during the first phase of the test under normal summer conditions. At the beginning of the second phase, this group was placed in the temperature controlled room with group 1. The temperature was gradually lowered and maintained at approximately 60 F for the last phase. Group 3 remained on pasture throughout the test.

The intervals between semen collection were four days between the first and second and seven days for each subsequent period.

Each collection was rated for motility (percent living cells), progressive movement, volume and sperm cell concentration.

Sperm cells from the two groups of rams that were on pasture during the first phase did not differ significantly from each other in motility and progressive movement ratings, but their ratings were significantly higher than those of the group kept under controlled temperature conditions.

During the first phase, semen from group 3 was significantly higher in concentration of sperm cells than that from groups 1 and 2.

During the second phase there was no significant difference between the three groups in quality of semen as measured by motility and progressive movement of sperm cells. In sperm cell concentration groups 1 and 3 rated significantly higher than group 2. Small but insignificant differences between the groups in volume of semen produced were found in both phases of the

Concluded on page 486

Editorial

PROGRAMED DISEASE PREVENTION

Speaking to veterinarians at the Kansas State College Short Course recently, Mr. Maurice Johnson, vice president of Staley Milling Company, pointed out that contract feeding is here to stay. His firm is a pioneer in this area of activity, and Mr. Johnson outlined clearly and concisely the role of the practitioner — from his point of view.

He pointed out that a woeful lack of business management exists in the area of contract feeding. Another problem is security. Those contracting fear inefficiency. Quick diagnosis, proper therapeutic feeding and treatment, preventive medicine — all rank high among contractor problems. In short, good veterinary service is a prime requisite to success in contract feeding. It is Johnson's opinion that in the future veterinarians will be employed by the feed company with a field staff reporting to the veterinarian; by the feeder large enough to afford a full-time or part-time man; and by the processor who often is having his products produced on contract.

These veterinarians will be asked to develop management rules and procedures and teach a field staff, develop reporting systems to keep him informed, learn and apply early diagnostic technics, work with nutritionists to develop rations to handle stress conditions, help advise on breeds and types that will yield the best returns.

In return for these services, Mr. Johnson believes veterinarians will find ample reward in the form of a more orderly routine, executive opportunities, and assured income. In preparation for this type of work, he recommends business courses, efforts to develop leadership and management abilities, summer work for students with feed companies and packers. He emphasizes that everyone is looking for the businessman-veterinarian and those who prepare will be rewarded.

Looking at the picture from the profession's viewpoint, we can readily agree that vertical integration will become increasingly important in types of agriculture where it obviously provides economic advantages. However, it seems safe to predict that for most agricultural products the next few years will show a clear cut trend to larger operations rather than toward vertical integration.

As far as the practitioner is concerned, it would seem to make little difference whether agriculture integrates vertically, horizontally or in wide concentric circles. Our fundamental concern is to recognize that we are gradually dealing with fewer clients with larger investments with an increasing concern for efficiency. Our job is to supply the kind of veterinary service needed by these operations. It makes little difference whether the financial investment belongs to the farmer, the feed company or the packer. If veterinary service increases operational efficiency, veterinary practitioners will be in increasing demand.

We can not entirely agree with Mr. John-

son's position that the veterinarian can best contribute as a full-time staff member of a large firm. Certainly increasing numbers of veterinarians will be required in the management of firms engaged in the contracting business, but it is difficult to see how a field staff could duplicate the impartial, on the spot management counsel of a good local practitioner.

Independently, a number of veterinarians have already moved to supply the preventive medicine programs demanded by contract operations and large units. The complete dairy herd program such as described by Dr. Erwin Plotcher in the June issue of VM has been well received by farm operators. In this issue the practical disease control program that saved the Iowa Cow pool points the way to the type of service that is being demanded.

Long-Term Problems

Like the farmer faced with the decision to go the integration route or expand his operation, the veterinary practitioner also has problems to consider and solve. Finance and operating capital loom as increasingly important factors. In the past a veterinarian might work for ten or more years to accumulate sufficient capital to build a clinic suitable for modern group practice. All too frequently the man that accumulates that much gets tired of practice and decides to invest in a farm or outside the profession.

Better financing is needed to put our good young graduates in proper facilities while they are still imbued with the enthusiasm attained at school. In a conversation with a major steel building manufacturer recently it developed that an excellent prefabricated hospital could be made available at minimal cost and completely financed to qualified veterinarians if the market demanded it.

A principal stumbling block has been that lenders have no standards by which to judge a veterinary practice. A state association committee appointed to counsel bankers could serve a useful function.

Another major problem is that the merits of a professionally supervised disease prevention program are being recognized by some agricultural leaders, but many farmers lack any understanding of this type of service.

Programed disease prevention can be effectively sold by an expanded veterinary extension program. A successful pattern has been established in several states. With extension veterinarians working with small groups of practitioners to achieve a relatively uniform program and the entire college extension staff pointing out the merits of such programs to progressive farmers, great progress could be made.

Assuming that we had enough good veterinary practices equipped with good facilities and an enlarged extension program to popularize professional disease prevention programs, we would still have a missing link. A uniform disease prevention program financially satisfactory to veterinarians and clients alike must be developed.

An excellent opportunity exists today to take a major step in this direction. Recent efforts to develop improved cooperation between veterinarians and the feed industry are gratifying. Now that we have learned to talk things over and have a cup of coffee together, we need something more specific to cement this relationship.

This common interest could well be jointly sponsored pilot field projects with the objective of developing a disease prevention program advantageous to all concerned. To be practical, such projects must be conducted under field conditions.

A Sample Program

As a starting point a swine project along the following lines might be tried:

1. The local feed dealer, a selected farmer and a practicing veterinarian will get together in an evening session and plan a complete breeding, feeding and disease prevention program best suited for this particular farm operation. Feed industry specialists and extension veterinarians could supply valuable assistance in a pilot project. While the feed representatives calculate proper feeding requirements for each phase of the life cycle, the veterinarian will schedule anticipated disease prevention measures. The finished program will be prepared in written form so that all parties will have a time schedule for their guidance.

2. At scheduled intervals, the veterinarian will call at the test farm to review the current status of the program. The feed representative may wish to make his visit at the same time. The veterinarian will check weights, conduct diagnostic procedures such as hemoglobin determinations, parasite counts, general examinations and if indicated, sacrifice an individual for postmortem examination and complete laboratory study. During these visits, vaccination schedules, castration procedures and sanitary recommendations will be reviewed, modified if indicated, and the feed additives prescribed for the next phase of the program. A written report of each visit will be sent to the client and feed industry representative.

3. If the feed company has a major financial interest it should foot the bill for this professional supervision. The company will be expected to supply the feed additives prescribed and incorporate them at a reasonable cost to the farmer.

4. The veterinarian will logically specify and supervise the use of immunizing agents and non-feed additive medications. If he supplies these materials, it must be at cost plus a modest distribution markup. An adequate professional service fee must be agreed on in advance.

The facts gathered from such a cooperative project could well lead to the development of a program satisfactory to all parties. With this type of local service available, the feed industry veterinarian responsible for feeding operations in widely scattered parts of the country could contract for his local disease prevention management and know that the best possible job was being done. —*C. M. Cooper, D.V.M.*

TEMPERATURE ON RAM SPERMATAZOA

Concluded from page 483

test. Considerable variation was found within groups in all semen characteristics studied. Little or no evidence was found to indicate that the lowered temperatures had any effect upon semen quality.

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Boar Testing Programs

Boar testing programs are in operation in some states, and doubtlessly will spread to others. Such programs are sponsored by Swine Improvement Associations. Testing is usually carried out when animals are between eight to 12 weeks of age. The rating is done on basis of backfat thickness, average rate of gain, and average feed efficiency. Animals must be performance registration rated (indicating such pertinent matters as size of litter) and must have attained a certain weight at given age. Under this system a minimum score is 100 for a good boar.

All of this information is to be entered separately in the sales ring catalogue. Some buyers will be looking for litter size, others for feed efficiency and rate of gain, or backfat probe results, or in other words it gives the prospective buyer the information needed to acquire an animal to meet his standard. The veterinarian enters the picture in that all boars must be certified as having a clean bill of health, including negative brucellosis and leptospirosis blood tests.—*R. R. Dykstra, D.V.M.*

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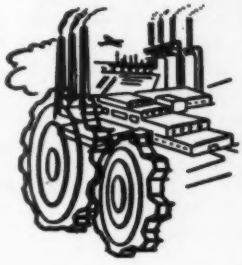

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Dr. B. C. Claussen

He is studying the research and production procedures of a typical, modern American medicine production plant. His studies in the United States are under the auspices of the American Scandinavian Foundation Trainee Program.

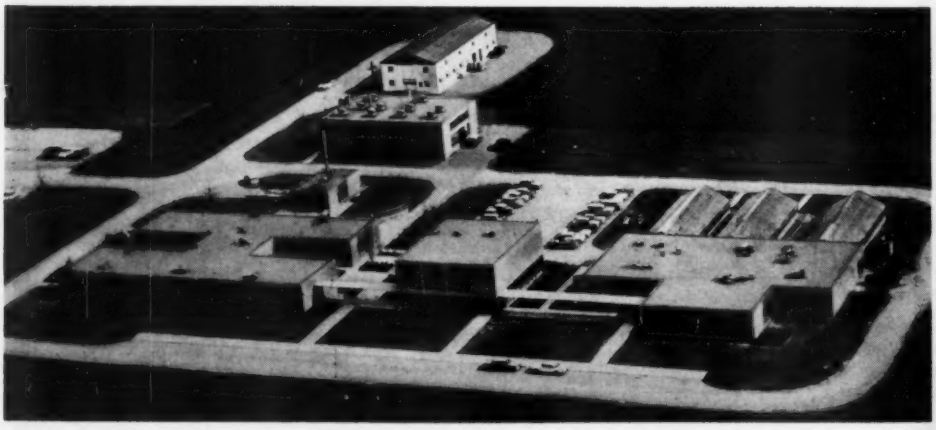
Doctor Buchanan to Washington

Dr. William S. Buchanan, Area Supervisor, Inspection Branch, Poultry Division, Chicago, Illinois was assigned to the Office of the Chief, Inspection Branch, Poultry Division, Washington, D. C. effective March 30, 1959. He has been a member of the Poultry Inspection Service since 1929. Doctor Buchanan graduated from the Chicago Veterinary College in 1910, and was with the Meat Inspection Service, Bureau of Animal Industry for several years prior to coming with the Poultry Inspection Service.

Doctor Dodge to Chicago Post

Dr. Roger E. Dodge has been assigned to the position of Area Supervisor of the Chicago, Illinois area office. Doctor Dodge will assume the duties and responsibilities of area supervisor of official plants operating under the Poultry Products Inspection Act and the Agricultural Marketing Act in the states of Illinois, Indiana, Kentucky, Michigan, Missouri, Ohio, and Wisconsin.

Dedicate New Lilly Research Center in Indiana



Several hundred persons attended the dedication of the Lilly Research Center for Agricultural Sciences at Greenfield, Indiana, June 16. Several of the facilities constituting the 15-building center include (left to right) the veterinary science, administration, and plant science buildings.

Practitioners' observations on new drugs are reported here each month as clinical notes, and do not constitute controlled research.

Clinical Report

CLINICAL EXPERIENCES WITH A NEW GLUCOCORTICOID

T. ELLSWORTH WILLIS, V.M.D.

Lansdowne, Pennsylvania

LITERALLY HUNDREDS of variations in configuration of the "meti" steroid molecule have been synthesized and studied since 1955 in an effort to improve over-all metabolic activity. Synthesized in 1958, Azium (Schering) the 9-alpha-fluoro, 16-alpha-methyl analogue of prednisolone, is some 80 times more potent than hydrocortisone and 20 to 25 times more potent that prednisone or prednisolone in animals.

Bailey's[1] recent report points out the potency advantages of this new steroid in large animal practice. The present report deals with the use of Azium in a series of 159 small animal cases.

Clinical Observations

Many conditions amenable to corticosteroid therapy require additional supportive or specific medication. This precludes a purely objective evaluation. In order to validate observed subjective responses to this drug an equal number of similar cases, were treated with prednisone or prednisolone. When possible, controlled treatment was concurrent with experimental therapy. More specific measures of therapeutic response would be desirable, but were not conveniently possible.

Azium was used only on cases where previous experience indicated the use of steroids would produce significant relief of symptoms.

Disturbances of Locomotion	No. Cases
Intervertebral disc syndrome	4
Ankylosing spondylitis	2
Osteoarthritis	3
Rheumatoid arthritis	1
Coxofemoral subluxation	2
Patellar luxation	1
Non-specific lameness	14
Total	27

Moderate to excellent suppression of symptomatology was noted in all cases. Degree and duration of improvement was not necessarily related to severity of pain or to gross evidence of pathology.

Two problem cases, of this group, are worthy of discussion. The first, an 8½ year old male Dachshund was presented with typical history of the disc syndrome. Extreme pain, kyphosis, partial posterior paralysis and altered thrust reflexes in the rear legs were evident. This dog was placed on 0.25 mg. Azium b.i.d. per os for three weeks. The dose was reduced to a single 0.25 tablet daily as needed for maintenance. The dog has been asymptomatic for the past seven months.

Congenital hip dysplasia was diagnosed in 1956 by *x*-ray in a male Boxer. At that time, the dog responded well to palliative treatment with hydrocortisone and aspirin. In May, 1959, acute symptoms developed in the same leg. Another *x*-ray revealed very little change from the original plate. One milligram of Azium was given I.M. daily for two days, after which symptoms regressed completely. The dog is now receiving 0.25 mg./day orally as needed to maintain remission of symptoms.

Dermatoses	No. Cases
Allergic dermatitis	12
Acanthosis nigricans	2
Idiopathic pruritis	5
Summer eczema	37
Otitis externa	4
Total	60

(Allergic dermatitis is here used to include urticaria, hives, drug allergy, wasp and bee stings, food allergy, solar dermatitis and photosensitization.)

The dermatoses above are an excellent clinical test of corticosteroid activity. The suppression of inflammation was more complete in degree and in duration in most cases than that seen in the parallel prednisone-prednisolone series.

Anti-inflammatory Activity

The benefits of enhanced anti-inflammatory activity were demonstrated in a typical case of chronic eczema. An eleven year old male Cocker was brought to the hospital in 1956 with about two-thirds of its hair gone. Skin was rough and thickened. Intense pruritis had aggravated self-mutilation. Appetite was poor and attitude was depressed.

At that time, treatment included prednisone, unsaturated fatty acids, and selenium sulfide baths with fair to good response. This dog tolerated 25 mg. I.M. injections of prednisone bi-weekly; less than this dose caused marked exacerbation of lesions while a larger dose seemed to induce polydipsia and polyuria. In January, 1959, this dog was given 0.25 mg. Azium b.i.d. by mouth for one week then maintained on 0.25 mg. every other day since that time. After eight months on this dosage, the dog's appearance and actions are better than at any time in the last five years. Effective anti-inflammatory activity without concomitant electrolyte disturbance by this drug during prolonged therapy is a distinct advantage.

Gastrointestinal Tract	No. Cases
Colitis	1
Food poisoning	2
Ulcerative stomatitis	1
Total	4

Steroids are often included in the management of certain severe gastrointestinal inflammations in man.[2,3] Empirically, adjunctive use of their anti-inflammatory activity seems justified in similar small animal conditions. Intramuscular doses (0.5 mg.) are repeated in 48 hours in conjunction with usual therapeutic measures for such cases. At present one can only say steroids will reduce severity of symptoms somewhat.

Circulatory Disturbances	No. Cases
Chronic interstitial nephritis	2
Chronic passive congestion	3
Phlebitis	2
Traumatic or surgical shock	8
Acute cellulitis	2
Toxemia	4
Total	21

Steroids have long been known to improve capillary and arteriolar tone and to inhibit extravasation of fluid and cellular components of the blood.[4] The gluconeogenic activity aids in protecting tissues against the effects of toxemia.[5] Both these effects supply valuable adjunctive therapy in edema, cellulitis, toxemia and traumatic shock. Acute phlebitis or perivenous cellulitis, from injection of irritant drugs, are rapidly reduced by two or three parenteral doses of Azium. Intramuscular injections (1 mg.) prior to surgery on aged, toxic or nephritic animals or where extensive surgery is contemplated, constitute routine therapy. Postoperative tissue swelling is reduced markedly.

Respiratory Conditions	No. Cases
Asthma-alveolar emphysema	1
Kennel cough	4
Tonsillitis	4
Rhinitis	1
Sinusitis	1
Total	11

These respiratory conditions are characterized by moderate inflammation and are aggravated by forced expiratory efforts. The rationale for steroid therapy is to reduce inflammation and exudation, covering existing infection with appropriate antibiotic therapy. This therapy is not specific, but results are somewhat better than previous symptomatic therapy.

Other Conditions	No. Cases
Acute conjunctivitis	6
Corneal laceration	2
Feline lacerations and abscesses	3
Eosinophilic myositis	1
Mast cell cytoma	1
"Yellow fat" disease	1
Inappetance and debility	20
Total	34

Subconjunctival injections of 0.1 to 0.25 mg. azium are indicated for prompt suppression of ocular inflammation. A case of acute eosinophilic myositis in an adult German Shepherd, diagnosed by clinical appearance of the dog and by a differential white cell count, responded dramatically to this drug, using 0.25 mg. b.i.d. for ten days.

The case of the mast cell cytoma was of special interest. This tumor was diagnosed by a university pathologist about one year ago. After surgery, this ten year old female Boston Terrier was treated with prednisone (10 mg.) administered intramuscularly once weekly for four weeks. Since that time, 0.5 mg. Azium administered intramuscularly, has been administered at three to six week intervals. After nine months of therapy, there has been no recurrence of the tumor at the original site, no enlargement of regional lymph nodes, and the chest has remained clear. Both cases demonstrate the profound leukocytic inhibition by the newer steroids.

Tomcats are frequently presented with lacerations, fistulae, or abscesses as sequelae of combat. I routinely drain abscesses, flush out fistulous tracts, administer penicillin-streptomycin combinations parenterally plus 0.25 to 0.5 mg. Azium I.M. to reduce inflammation. The new steroid effectively reduced inflammation without inducing the disagreeable polyuria encountered with other steroids.

Discussion

The average maintenance dose was found to be 0.25 mg./25 to 30 lb. body weight every other day. Response to this dose compares favorably to responses noted in animals given equivalent amonts of prednisone or prednisolone in the parallel (but necessarily incomplete) control series of similar cases. No electrolyte imbalance was observed in any dog receiving up to five times this dose. The only marked electrolyte disturbance (polyuria) in the entire series occurred in a 4.5 lb. Chihuahua given a dose adequate for a 50 pound dog. Several animals in this series have been on maintenance doses for six to nine months.

Anti-inflammatory, gluconeogenic, antiallergic, anti-toxic and anti-anorexigenic effects are not qualitatively different from those of older steroids. The differences are a matter of degree. Clinical experience confirms laboratory findings that this drug is 80 to 100 times more potent than hydrocortisone and 20 times more potent than prednisone or prednisolone. Safe therapeutic doses appear to produce more complete response. Therapeutic activity has been maintained by dosing only on alternate days; a schedule more likely to be continued by an owner.

Conclusions

A new prednisolone analogue has been used in a variety of small animal indications amenable to corticosteroid therapy. Differences in response to this drug and older steroids were principally quantitative. Long term therapy was found entirely feasible. The less frequent maintenance dosage

requirement was conducive to good client cooperation.

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Bovine Papillomas

The use of a glycerol-saline growth suspension in the treatment of cattle with benign skin papillomas is described by Pearson, *et al.* in Tissue Vaccines in the Treatment of Bovine Papillomas.

In a two-year period autogenous and non-autogenous vaccines were used for the inoculation of 233 cattle, two subcutaneous injections of 10 ml. and 15 ml. at a 14-day interval being recommended.

The results obtained on 197 cattle show that 87% of cattle with papillomas on the general body surface responded to autogenous vaccine. Teat wart vaccines were of value in only four out of 12 cattle treated. Bull penis growths disappeared after autogenous vaccination in four out of five cases. Uninoculated control cattle were kept on 15 farms where autogenous vaccines were used and showed virtually no change in skin tumor condition in a period during which vaccinated cattle showed regression of lesions. At the end of two years, 21 practices were using papilloma vaccines. — *The Veterinary Record, November 29, 1958.*

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Names of classified advertisers using V. M. key numbers can not be supplied. Address your inquiry to key number care VETERINARY MEDICINE, Suite 803, Livestock Exchange Building, Kansas City 2, Missouri, and it will be promptly forwarded to the advertiser.

Deadline for copy — 5th of month preceding date on issue.

For Sale

DOG BOOKS: Write us. Free to all veterinarians. Write us for free copy of Judy's Four Years calendar. Ideal for your office. Judy Publishing Company, 2517 Michigan Boulevard, Chicago 16.

INDIANA MIXED PRACTICE: Primarily dairy and hogs; 20% small animals. Home, hospital and all equipment included. Priced for quick sale. Address Box 584, care VETERINARY MEDICINE.

SMALL ANIMAL HOSPITAL: Chicago suburb. Long established, fully equipped, capacity 120 kennels, outdoor runs, three apartments on premises. Address Box 585, care VETERINARY MEDICINE.

ESTABLISHED MIXED PRACTICE: In central Wisconsin. Home, office, drugs, and equipment. Excellent opportunity. No blue sky. Address Box 586, care VETERINARY MEDICINE.

MIXED PRACTICE: Established Southern Wisconsin mixed practice for sale. Large office with apartment, heated double garage, home. Address Box 591, care VETERINARY MEDICINE.

MIXED PRACTICE: For sale mixed practice and hospital in midwest college town. $20,000 gross; could support two men. $5,000 to handle; other interest. Address box 592, Care VETERINARY MEDICINE.

Wanted

RESEARCH VETERINARIAN: Progressive manufacturer of feed medications and veterinary products with national distribution desires veterinarian as part of its expansion program to conduct therapeutic studies and critical evaluation tests. Advanced degree and some experience is preferred but not required. Please submit detailed resume. Address Box 588, care VETERINARY MEDICINE.

VETERINARIAN: With California license wanted as associate in busy, well-established, mixed practice, 90% small animal, in Southern California. Address Box 583, care VETERINARY MEDICINE.

PHARMACEUTICAL CHEMIST: Pharmaceutical Chemist Ph.D. to head Pharmaceutical Research and Development Section of expanding Research Department. Growing company in field of ethical biological and pharmaceutical products. Must have administrative and executive potential and must be able to direct and coordinate research projects. Opportunity and growth potential excellent. Salary commensurate with training and experience. Address Box 590, care VETERINARY MEDICINE.

ASSISTANT VETERINARIAN: For small animal hospital in Chicago. Good opportunity. Address Box 582, care VETERINARY MEDICINE.

DOCTOR.. MASTITIS CONTROL

Calls for Early Detection

So that you may be better acquainted with the **MERITS** of our Accuracy Attested — The KO-EX-7 Brom Thymol Mastitis Detectors with the green spots which tell the Degree of Severity of the infection, we will gladly mail you a full sized box FREE upon request. Write today. Sold all over the World.

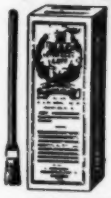
BEST BY TEST

Sole Manufacturers

STERLING RESEARCH CORP.

Dairy Div. VM Sidway Bldg. Buffalo 3, N. Y.

M·A·C



Quick relief for Bone, Bursal or Tendon Lameness

Single Bottle.....$2.00
3 and 1 free.....5.00
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Hudson, N. Y.

Human Leptospirosis

Medical journals report increased frequency of *Leptospira icterohemorrhagiae* in the human patient, and all such reports point to the dog as the origin of the infection. Human deaths are not uncommon. Veterinarians have a distinct responsibility to establish this animal-man relationship and warn the owners of dogs to be on guard when a diagnosis has been established or even when it is only suspected.

BIOLOGICAL PRODUCTION: Opportunity for top production man either D.V.M. or Ph.D. for Biological Production with an ethical veterinary supply company. Requirements include biological production experience, administrative and executive potential and ability to direct people. Opportunity for growth. Salary commensurate with training and experience. Other employee benefits. Address reply to Box 589, care VETERINARY MEDICINE.

VETERINARIAN: As an assistant in Minnesota Twin City area small animal hospital. Give details regarding education, experience, family status, etc. Write Box 593, care VETERINARY MEDICINE.

VETERINARIAN: Excellent opportunity for veterinarian to assist in well established practice—percentage equine. Florida license required. Address Box 587, care VETERINARY MEDICINE.

You've Tried the Rest — NOW...

Why carry more than one ataractic agent in your bag when SPARINE is the obvious choice? Besides the difference in name, SPARINE differs from other ataraxics in its patient versatility, wide range of indications, proved effectiveness, and safety.

SPARINE is versatile. It has been used successfully in dogs, cats, horses, cattle, sheep, and swine.

Because SPARINE controls tension, nervousness and unruliness in animals, it is particularly indicated whenever an animal's potential for aggressively defensive actions must be reduced. For example, it is indicated for physical and x-ray examination; dentistry; branding, dehorning, shoeing, hoof trimming; as adjunctive therapy in tetanus; and to reduce self-mutilation associated with eczema, pruritus, and otitis.

In both major and minor surgery, SPARINE relieves pain associated with surgery and potentiates anesthetics used. It may be used in conjunction with local anesthesia in many surgical conditions where a general anesthetic is not desired. It calms animals during hospitalization and convalescence.

SPARINE controls hysteria in sows at farrowing time, and, given to ewes at lambing time, facilitates adoption of strange lambs. SPARINE reduces weight losses of cattle caused by the rigors of shipping.

SPARINE is proved safe. No instance of anemia or other blood dyscrasias, jaundice, agranulocytosis, hematuria, urticaria, photophobia or allergic dermatitis has been reported with SPARINE.

Available:
Tablets: 25, 50, 100 mg., vials of 50.
Injection: 50 mg. per cc., vials of 10, 30 and 100 cc.

Comprehensive literature supplied upon request

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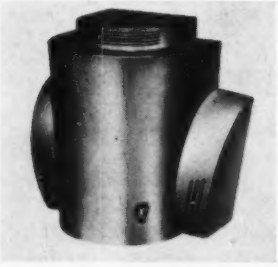
INJECTION
Sparine®
HYDROCHLORIDE
Promazine Hydrochloride, Wyeth

Wyeth®
Philadelphia 1, Pa.

This department will announce each issue new therapeutic items, equipment, services, and literature of interest to veterinarians. All claims made are those of the firms concerned. Send communications to the address noted.

Reader's Service

New **Keythol Area Deodorizer** has optional double-strength capacity necessary to overcome strong odors of animals, chemicals, etc. It holds liquid or block refills and its modern styling makes it an asset in any



Keystone Scent Conditioner Corp.

setting. The right scents for individual problems are engineered by technical consultants at the time of installation to guarantee the very best in odor control. Check with Keystone Scent Conditioner Corp., 315 N. 12th Street, Philadelphia 7, Pennsylvania.

A six page **Medical Office Accounting Plan Brochure** describing the operation of a new medical office accounting plan is available from Royal McBee Corporation. The new, low-cost plan allows the office assistant for a veterinarian or small clinic to create all patient account records with one writing. It features the medical office poster, and a set of patient records designed for medical offices. Manufacturer claims clerical savings of up to 60% over manual methods. For details ask Royal McBee Corporation for S-513. Address their Data Processing Division, Port Chester, New York.

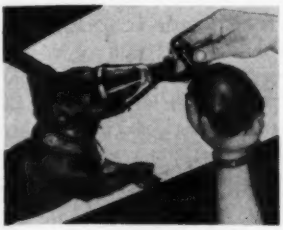
Termed the **World's Smallest Resuscitator,** this three-inch unit can gently force oxygen through an opening no larger than a pinhole, yet automatically adjusts to lung

National Cylinder Gas Corp.

capacity. It is so sensitive it can be used successfully on a parakeet or mouse. The unit was recently introduced by National Cylinder Gas Division of Chemetron Corporation.

Both **Oxygen Therapy and Positive Pressure Resuscitation** of small animals are simplified by a new unit with a cone-shaped face mask vacuum-formed from tough Tenite butyrate plastic. The mask is transparent, enabling the operator to observe the patient during treatment. Oxygen is administered by allowing gas to flow from the cylinder into a bag, or bellows, and then into the animal's nose and lungs. For positive pressure resuscitation, the bag is squeezed while the exhalation port is closed with the thumb. A

valve prevents the animal's exhalations from re-entering the bag and assures a pure oxygen supply. For details on resuscitator, ask



Ohio Chemical and Surgical

Ohio Chemical and Surgical Equipment Company, 1400 E. Washington Avenue, Madison 10, Wisconsin.

Formica Laminated Plastic-lined Dog Cages have been developed by the Snyder Manufacturing Company, and are now available to the profession. All corners are seamless and covered with plastic. Cage floors have

Snyder Mfg. Co.

no-drip edge at the front to prevent liquids from spilling into cage beneath. Units are available with built-in electrically heated floors and can be equipped with Formica card-holders which match the interiors. For full information, write Snyder Manufacturing Company, 1823 South Ivy, Denver 22, Colorado.

The **UFAW Handbook on the Care and Management of Laboratory Animals** is being distributed throughout the United States by the Animal Care Panel. A review of this book appeared in the April 1959 issue of VM. Check with Animal Care Panel, P.O. Box 299, Lemont, Illinois.

EVSCO

ZERNIUM

A Corrective Skin Shampoo

For the Control of Non-Specific Dermatoses in Small Animals

Zernium is non-toxic and non-irritating to dogs and cats . . . a combination of *TWO* metallic salts in suspension.

FORMULA:

Zirconium Oxide.....4%
Cadmium Sulfide.....1%
in a foaming detergent base.

Available in 6-ounce plastic squeeze bottles with dispensing label or in one gal. containers.

12 six-oz. Bottles: $8.40
1 GALLON: $12.50

Ethical

An EDGE on them all

Cutting efficiency and maximum blade performance has always been the surgeon's first consideration when choosing a surgical blade. BARD-PARKER offers you a blade made with the same consideration in mind . . . a blade of carbon steel of course . . . so superior for fine cutting edges.

B-P RIB-BACK Blades are now available...

in the Puncture Proof Sterile Blade package that can be autoclaved.

in the CONVENTIONAL package — six of one size in a rustproof wrapper.

Ask your dealer

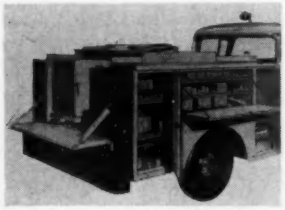
It's Sharp

B-P BARD-PARKER COMPANY, INC.
DANBURY, CONNECTICUT
A DIVISION OF BECTON, DICKINSON AND COMPANY

B-P • RIB-BACK • IT'S SHARP • RACK-PACK are trademarks of BARD-PARKER

A **Cap-chur Short Range Syringe Projector** is being offered free to all veterinarians with the purchase of 36-100 cc. vials of Trilafon (Schering) between August 3 and October 31. This automatic projectile-type syringe, resembling a hand gun or pistol, has been developed for short range medication and immobilization of large and small animals. For details check with Schering Corporation, Bloomfield, New Jersey.

A specially developed **Multi-compartmented Steel Body** to serve the needs of large animal veterinarians is now being manufactured by Reading Body Works, Inc., of Reading, Pennsylvania. Called Vetro, it



Reading Body Works

provides refrigerated and heated storage space for medical supplies, instruments and equipment, plus heated running water.

Vionate-L designates a new high potency vitamin and mineral supplement formulated especially for horses. "Palatized" with molasses and apple flavoring, and pelletized for easy use, Vionate-L contains all nine vita-

E. R. Squibb

mins and nine minerals known to be essential for good health, good bone, vigor and stamina in horses. The product is particularly beneficial for the brood mare to provide bone-building calcium, phosphorus and vitamin D.

STRIKES
INTESTINAL INFECTION
BACTERIAL DIARRHEAS
AND
ENTERITIS
IN
THE BIOSOL FAMILY,
a group of exceptionally potent antidiarrheal agents containing the broad-spectrum antibiotic neomycin. Four convenient dosage forms permit easy treatment of herd, flock, kennel or individual. Biosol, added to the drinking water, milk or feed, administered as a drench, or given as tablets or boluses, is absorbed only sparingly . . . assures prompt, positive antidiarrheal action because it remains where it is needed most: at the infection site . . . the gut. Its nontoxic and demulcent properties make Biosol particularly effective in treating stubborn bacterial diarrheas in very young animals.
BIOSOL*
LIQUID, ORAL POWDER,
TABLETS and BOLUSES
*TRADEMARK, REG. U. S. PAT. OFF.
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Now *a means of limiting your dispensing inventory of anti-infective soluble powders*

Cosa-Terramycin®

Fortified Soluble Powder

oxytetracycline with glucosamine and vitamins

an oral dosage form designed for therapeutic effectiveness in most species.

Proven broad-spectrum antibiotic—Terramycin—25 Gms. per pound

Wider range of activity
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Low toxicity
Stable in blood serum
Effective where other antibiotics fail

Well balanced vitamin formulation

A—500,000 I.U. per pound
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E—150 units per pound
B_{12}—2,000 mcg. per pound
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The weakest link could mean...

DISASTER

. . . and the loss of the lives of an entire party of mountain climbers. That's a chance that every member in the party takes when undertaking a new adventure. Every precaution is taken to avoid mistakes, but even then there is apt to be dangers awaiting their every move.

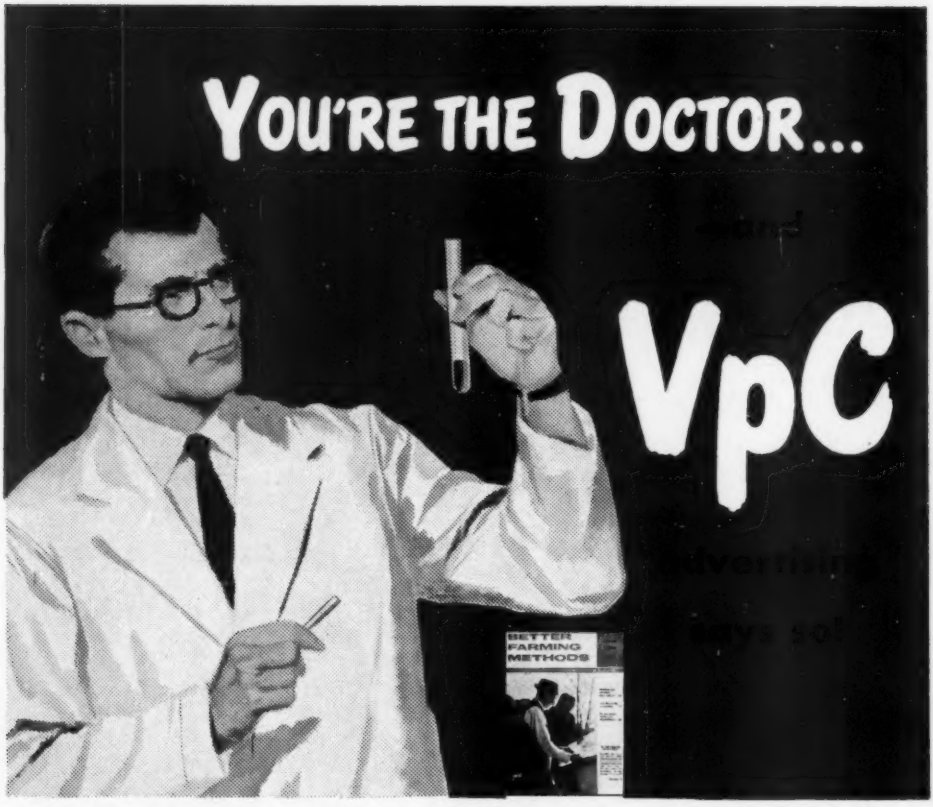
It's these dangers that imperil the success of the expedition. There are dangers that imperil the existence of your Independent Veterinary Wholesaler . . . dangers in the form of strong competition from the industries' corporate giants . . . dangers that could snap his chain of personalized service to the profession. Lend your support to these Independent Veterinary Wholesalers and guarantee their continuance of personalized service.

PRW6

DIAMOND LABORATORIES

DES MOINES, IOWA

SUPPORT YOUR INDEPENDENT ETHICAL WHOLESALER



Correctly diagnosing a nutritional imbalance is a specialized field. Yet many feeders, when faced with symptoms of dietary deficiencies, seek advice from their local Vo-Ag man, county agent, or other leading agricultural expert—men of the soil whose training and experience do not prepare them for such a specialized service.

Vitamineral is currently campaigning for *you* with big color advertisements in *Better Farming Methods*—read by thousands of these leading agricultural advisers. We are calling a spade a spade. *No one* is more trained than you to recognize the nutritional limitations of crops grown in your area. *No one* is more qualified than you to recommend a correctly-balanced, productive feed formula combining home grown grains and highest-quality vitamin and mineral supplements.

We want ag leaders in your area to recommend *you* for advice on every specific feeding program. And we're backing you up with the finest vitamin and mineral supplements obtainable . . . to be fed *only* according to your professional recommendations.

For over 40 years, highest-quality Vitamineral supplements have been available only through veterinarians.

VETERINARIAN'S FORMULA FEED MANUAL

Handy reference guide for both veterinarian and client. NEW, bigger, (56 pages) fully illustrated—contains dozens of proved formulas for low-cost feeds utilizing home grown grains . . . suggestions on management, sanitation, deficiencies. Send for your free copies now!

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Via-D-Mineral . . . Con-o-mineral . . . Viamineral . . . Ribad . . . Via-Z-Mineral . . . VpC Dog Food Supplement

for **MASTITIS** *of*

dry and lactating cows

NEW SQUEEJET T.M.*

single-dose dispenser for

FURACIN® SOLUTION *veterinary*

brand of nitrofurazone

- delivers one full dose
- is discarded after using
- saves time
- is convenient, especially when a number of cows are to be treated
- unique package

*design patented

FURACIN has been shown to be strikingly effective in controlling mastitis under field conditions.[1,2] Of 7,123 lactating cows with acute mastitis, fair to excellent results were obtained in 5,597 (78%). Of 3,418 dry cows which had had mastitis during their previous lactating period, fair to excellent results were obtained in 3,104 (90%).

SUPPLIED A water-miscible liquid of FURACIN 0.2% in polyethylene glycol and water. Single-dose SQUEEJET disposable dispenser of 30 cc. Still available, bottles of 500 cc. with rubber stopper and 1 gal.

1. Mires, M. H., and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 2. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950.

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NITROFURANS—a *new* class of antimicrobials— neither antibiotics nor sulfonamides

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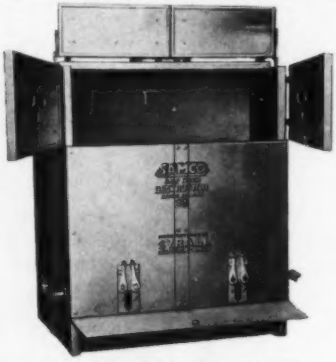
SAMCO
CREMATORY DESTRUCTOR
Gas Fired for
ANIMAL CARCASS CREMATION
(Engineered Special for Veterinary Practitioner)



Extra Large Feed Door 45" x 20"
Capacity 17 Bushel — 2 Burners
100% SAFETY AUTOMATIC THERMO PILOT VALVE
Each Main Burner with Pilot Light and Timer Shut-off.
GREAT HEAT and FIRE POWER
Smaller Sizes Available
Investigate unique purchase plan for great savings
SYRALL MFG. CO., 511 N. State, Syracuse 3, N.Y.

Dr. L. M. Hutchings Succumbs

With the passing of Dr. L. M. Hutchings last month, the turnstile of time clicks off another entry in the fabulous story of veterinary education. He was dean of the new

Dr. L. M. Hutchings

school of veterinary medicine at Purdue University. The Associated Press reported that Dr. L. M. Hutchings died July 22, after losing a prolonged battle to malignancy.

tested medicinals direct by mail

10cc Procaine Penicillin — Aqueous Suspension 300,000 Units per cc Standard Brand Expires February 1960	10 Vials	$ 2.80
	100 Vials	24.00
	1000 Vials	210.00
10cc Procaine Penicillin — 400,000 Units with ½ gm. Dihydrostreptomycin in each 2 cc Aqueous Suspension Standard Brand Expires September 1959	10 Vials	5.50
	100 Vials	50.00
	1000 Vials	450.00
100cc PFIZER Procaine Penicillin aqueous suspension 300,000 Units per cc expires January 1961	1 Vial	2.70
	5 Vials	12.00
	10 Vials	23.00
	100 Vials	210.00
10cc Dihydrostreptomycin Solution — ½ gm. per cc Expires January 1962	10 Vials	5.70
	100 Vials	52.00
	1000 Vials	480.00
100cc PFIZER Combiotic expires January 1962	1 Vial	4.95
	5 Vials	23.00
	10 Vials	42.50
	100 Vials	400.00

Penicillin Tablets — Soluble — 100,000 Units	100	1.35
	1000	12.00
	5000	53.00
Penicillin Tablets — Soluble — 200,000 Units	100	2.40
	1000	21.50
	5000	100.00
Penicillin with Triple Sulfas — 300,000 Units	100	4.00
	1000	36.00
5cc Acth-Gel — 40 units per cc Standard Brands	1 Vial	2.50
	10 Vials	22.50
	100 Vials	210.00
100 Stearane 5 mg		8.50
5 x 100 Stearane 5 mg		40.00
Prednisone or Prednisolone — 5 mg — Specify	100	3.75
	1000	32.00
	5000	150.00
10cc Vitamin B_{12} — 1000 Mcg. per cc Crystaline — U.S.P.	1 Vial	2.25
	10 Vials	20.00
	100 Vials	180.00
	1000 Vials	1700.00

Minimum Shipping Order $25.00. Postage prepaid. Check with order.
VETERINARY MEDICINE SUPPLY CORP. 130-05 LIBERTY AVENUE, RICHMOND HILL, N. Y.
Cable: Herblews New York Phone: Michigan 1-5650 Prices subject to change without notice.

nationally known antibiotics, therapeutics, hormones, biologicals, vitamins and pharmaceuticals for all animals

For well over two decades, Doctor Hutchings was a significant and constructive part of that variegated fabric called the veterinary profession. He had a strong personality, vigorous and emphatic, which brought zest and life to a fast moving, complicated world that could often be dull and abrasive — all of which made him stand out brightly among the multiple characteristics which make up the veterinary profession.

A recognized leader in the field of basic veterinary research, his frequent references to wheelbarrow and pitchfork investigations typified the modest practice style presentations he delivered to veterinarians throughout the country. He was a scientist dedicated to the solution of everyday problems.

A graduate of the University of Maine (B.S. in 1937), Doctor Hutchings received his D.V.M. degree from Michigan State University in 1940 and his M.S. in 1942. In 1947 he received a Ph.D. from Purdue University. He joined the staff at Purdue in 1942 and was named professor in 1947. He became head of the Department of Veterinary Science in 1950.

In 1947, Doctor Hutchings won the Sigma Xi Research Award for contributions to the study of brucellosis.

He was a member of the sections on animal health, brucellosis and leptospirosis in man and animals of the National Research Council as well as the Committee for Eradication of Hog Cholera of the United States Livestock Sanitary Association. He served on the world Health Expert Panel on brucellosis and was a member of the A.V.M.A. executive board from District 3.

Mating Performance

Younger and older cows are less efficient than cows of intermediate age in mating performance, according to research reported in the *Journal of Animal Science*, February 1959. Cows four and five years of age mated to bulls four and five are most efficient. The least efficient matings were those of old cows and old bulls.—*R. R. Dykstra, D.V.M.*

"CAP-CHUR" EQUIPMENT

Automatic projectile type syringe delivered by a specially designed pneumatic rifle.

Excellent for immobilizing, capturing, restraining or treating wild or feral animals.

Effective for animals of all sizes. From one to ten milliters of any liquid compound can be injected into an animal from distances up to approx. 50 yards.

Reasonably priced. Write for complete information.

PALMER CHEMICAL & EQUIPMENT COMPANY, INC.

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ATLANTA 3, GEORGIA, U.S.A.

Laboratory Service for Veterinarians

VETERINARY DIAGNOSTIC LABORATORIES

These laboratories have been established to aid veterinarians in the diagnosis of obscure as well as common ailments in large and small animals. The chief aim of our staff is to give quick and accurate diagnosis at all times.

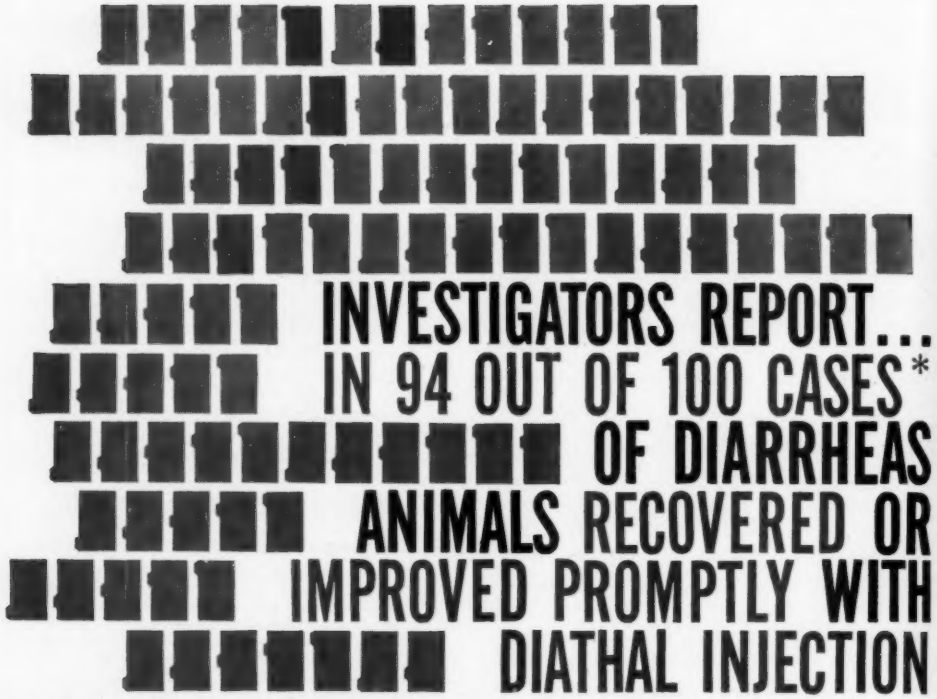
Our service includes fecal examinations, anti-biotic sensitivity tests, urinalyses, blood counts, tissue sections, bacteriological cultures, cultures for ringworm and blood chemistry. It is designed to assist owners and breeders of stock of all kinds including dogs, cats, horses, cattle, poultry, hogs and sheep.

Sample containers and price list on request.

VETERINARY DIAGNOSTIC LABORATORIES

3 East 65th St., New York 21, N.Y.

Telephone: LEhigh 5-9188



a distinct advancement in the control of problem diarrheas

DIATHAL exerts a *suppressive action* on gut motility, provides wide-spectrum *antibacterial action* against enteric organisms and has the added *protective action* of controlling nausea and vomiting associated with virtually all diarrheas of cats, dogs and horses.

DIATHAL is indicated for intramuscular use *only* in dogs, cats and in horses not destined for human consumption.

packaging DIATHAL Injection, 10 cc. vials, boxes of 1 and 6. DIATHAL,® procaine penicillin G in dihydrostreptomycin sulfate solution with diphemanil methylsulfate.

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DIATHAL INJECTION

Schering

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*Good results in 226 of 236 cases reported to Clinical Research Division.

Colonel Townsend to New Post

Colonel Frank M. Townsend, U.S.A.F., M.C., has been appointed Director of the Armed Forces Institute of Pathology succeeding Captain William M. Silliphant, M.C., U.S.N. Colonel Townsend is the first Air Force Officer to assume the Directorship.

Colonel Frank M. Townsend

The Armed Forces Institute of Pathology is the central laboratory of pathology for the Department of Defense.

Many companies are trying to "imitate and duplicate but have failed to formulate!"

GENUINE

OCUROL-VET

The pinkeye medicine of choice among leading veterinarians around the world. Order from your favorite veterinary distributor.

THE OCUROL-VET COMPANY ★ SABINAL, TEXAS

TOTAMIN

T. M. Reg.

- Amino Acids
- Minerals and Vitamins

SOLD THROUGH THE VETERINARIAN

Write for an illustrated folder today or ask your distributor.

NUTRITIONAL MINERALS

Box 505, 404 E. 12th St.

Sioux Falls, S. Dak.

INJURED TEATS
SCAB TEATS
STENOSIS
POST-OPERATIVELY

To maintain unrestricted milk flow and provide medical antisepsis are of prime importance in treating teat troubles. Dr. Naylor Dilators accomplish these 2 objectives specifically with this 2-WAY ACTION:

1. MECHANICAL ACTION . . . gently supports sphincter and teat mucosa—keeps teat open and promotes easier, natural milking. Positive retention in small or large teats.
2. MEDICAL ACTION . . . *Sulfathiazole* released slowly from within the Dilator provides broad antimicrobial protection; combats infection and reduces swelling; minimizes ascending inflammation and promotes healing.

WITH ANTIBIOTICS . . . Saturated with your favorite udder infusion antibiotic, Dr. Naylor Dilators are an ideal vehicle for additional local medication following teat surgery.

Available from your ethical supplier or write Dept. "P"

H. W. NAYLOR CO., Morris, N. Y.

Dr. Naylor

Medicated
Teat Dilators

SUPPLIED:
Dispensing vials—16's
Labled packages—42's

Outstanding effectiveness in the routine treatment of CANINE DIARRHEA

FURADEX™ ORA-BOLS® veterinary

Complete remissions in 37 of 38 dogs[1]

FURADEX "... shortened the duration of diarrhea in comparison with previously used drugs, and in most cases produced an apparent complete recovery . . . (The diarrhea) generally ceased in 2 to 7 days without any side effect due to medication."[2]

Containing FURACIN® (brand of nitrofurazone) in an excipient of dextrose for peroral therapy, FURADEX is achieving striking results in bacterial and nonspecific diarrheas and in diarrheas associated with other diseases such as distemper and hepatitis. FURADEX has the advantage of being highly palatable to dogs, which facilitates treatment,[1,2] and is a point of superiority over other preparations.

SUPPLIED: 50 mg. scored ORA-BOLS, bottle of 100.

REFERENCES: 1. Pollock, S.: Control of Nonspecific and Specific Enteritis in the Dog; read at the First Regional Conference on the Nitrofurans in Veterinary Medicine, Wilmington, Delaware (June 5, 1958). 2. Fisher, G. W.: Oral Use of Furadex in Canine Diarrhea, N. A. Vet. 39:133-134 (Mar. 15) 1958.

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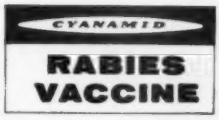

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Swangard to Diamond Labs

Dr. W. Michael Swangard has been appointed director of trade relations for Diamond Laboratories, it was announced recently.

Dr. W. Michael Swangard

As director of trade relations, he will be a consultant to the Biological Research Department, and will be in charge of export and import of Diamond products and German-made instruments for the Sales Department.

Dr. Swangard, born in Munich, Germany, attended the Universities of Saskatchewan, British Columbia, and Munich. He received his D. Sc. (V.M.) from the University of Munich in 1939.

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Veterinary Calendar

Aug. 23. **American College of Veterinary Toxicologists,** 2nd annual meeting. Hotel Muehlebach, Kansas City, Missouri. Dr. William F. Harris, 1102 E. Main, Puyallup, Washington, secretary.

Aug. 23-27. **American Veterinary Medical Association,** 96th annual meeting in conjunction with **Third Pan American Congress of Veterinary Medicine.** Municipal Auditorium, Kansas City, Missouri. Dr. H. E. Kingman Jr., 600 S. Michigan Avenue, Chicago, Illinois, executive-secretary.

Sep. 3-4. **Colorado Veterinary Medical Association,** annual meeting. Shirley Savoy Hotel, Denver. Dr. Gail H. Gilbert, 5500 Wadsworth Avenue, Arvada, Colorado.

Sept. 10-11. **Midwestern Interprofessional Conference on Diseases of Animals Transmissible to Man,** 2nd annual meeting. State University of Iowa, Iowa City, Iowa. Dr. R. A. Tjalma and Dr. Ian Maclean Smith, co-chairmen of the 1959 Conference.

Sep. 21-22. **New Mexico Veterinary Medical Association,** annual meeting. Western Skies Hotel, Albuquerque, New Mexico. Dr. E. R. Leslie, Carlsbad, New Mexico, secretary.

Oct. 7-9. **Purdue University, Conference for Veterinarians.** Purdue University, Lafayette, Indiana. Dr. L. M. Hutchings, chairman, Conference Committee.

Oct. 15-16. **Eastern Iowa Veterinary Association,** 46th annual meeting. Hotel Roosevelt, Cedar Rapids, Iowa. Dr. Charles B. Thayer, Iowa City, Iowa, secretary.

Oct. 18-20. **Texas Veterinary Medical Association.** Hotel Windsor, Abilene, Texas. Paul B. Blunt, 710 Maverick Building, San Antonio, Texas, executive secretary.

Oct. 24. **Iowa State College Veterinary Homecoming Luncheon.** Veterinary Courtyard, Iowa State College, 11:00 a.m.

Oct. 29-31. **Animal Care Panel,** annual convention. Sheraton Park Hotel, Washington, D. C. Dr. William I. Gay, 2101 Constitution Avenue, N.W., Washington 25, D. C., chairman.

Nov. 2-3. **University of Missouri,** 35th annual veterinary conference. School of Veterinary Medicine, Columbia, Missouri. Dr. Cecil Elder, chairman.

Dec. 7-8. **Kentucky Veterinary Medical Association,** winter meeting. Sheraton-Seelbach Hotel, Louisville, Kentucky. Dr. L. S. Shirrell, 545 East Main, Frankfort, Kentucky, secretary.

Dec. 15-18. **United States Livestock Sanitary Association,** 63rd annual meeting. Sheraton-Palace Hotel, San Francisco, California. Dr. James E. Stuart, 1220 N Street, Sacramento 14, California, chairman.

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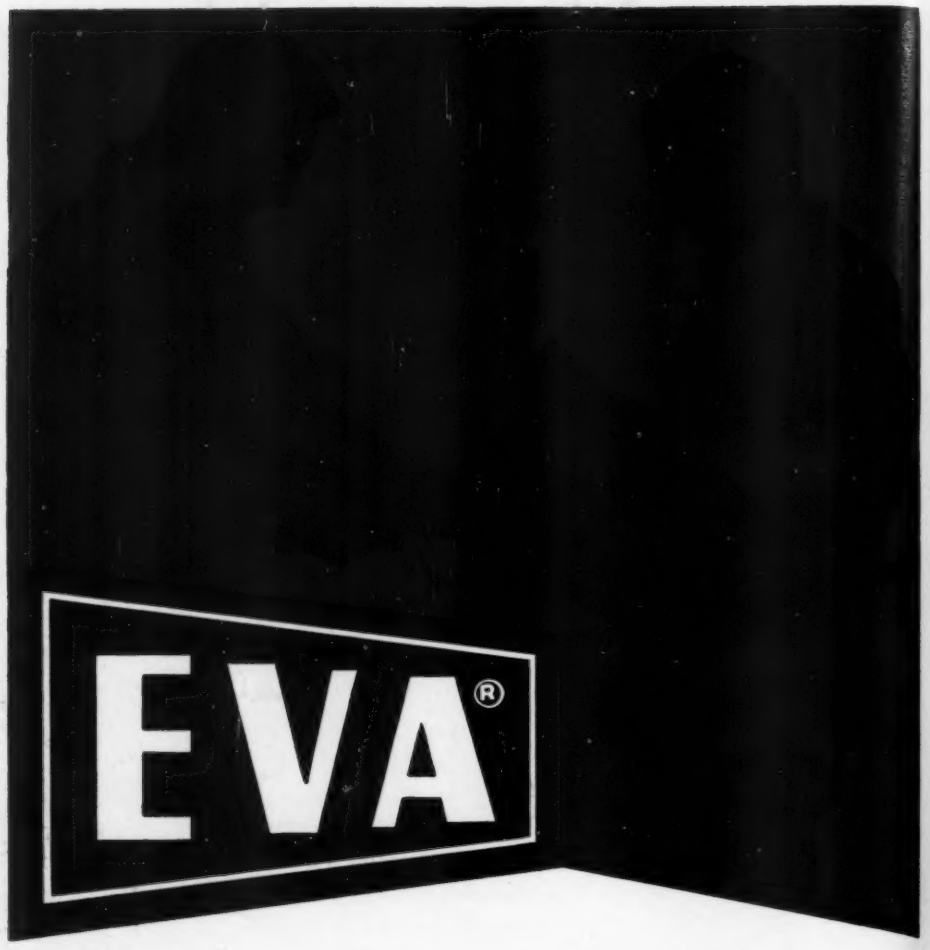

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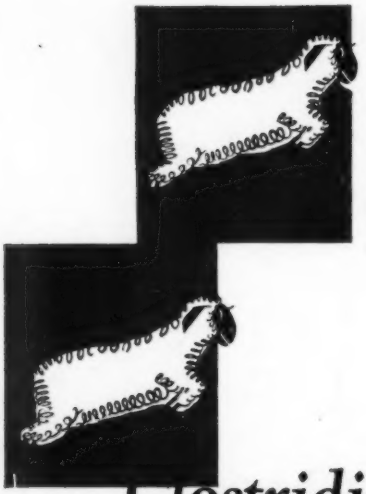

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